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Forages at KCA

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Kentucky Forage and Grassland Council
Kentucky Master Grazer

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C. Teutsch, C. Forsythe, and R. Pampell, editors

College of Agriculture, Food and Environment
Grain and Forage Center of Excellence
Kentucky Cattlemen's Association
The Kentucky Forage and Grassland Council
Kentucky Master Grazer Educational Program
KADF Kentucky Agricultural Development Fund
KBN Kentucky Beef Network, LLC

Foreword

This marks the twenty-fourth consecutive year we have had a Forage Symposium at the Kentucky Cattlemen's Convention. We challenge you to consider the content of the proceedings and the discussions of the day in light of your overall forage program. It is our hope you will go away with at least one idea or practice that you can implement to improve the profitability of your operation.

On behalf of the program committee, I want to thank Mr. Dave Maples and his staff at Kentucky Cattlemen's Association for their support, assistance, and encouragement. In addition, I want to thank the Kentucky Forage and Grassland Council and the Master Grazer program for their support of this session and continued efforts to advance grazing management in the Commonwealth through high quality educational programs. I would like to express sincere gratitude to our speakers for taking time out of their busy schedules to spend the afternoon with us and share their knowledge and insights.

A very special thanks is extended to Drs. Ray Smith and Jim Henning for their assistance in planning this program and to Christi Forsythe and Rehanon Pampell for assembling and printing these proceedings.

I encourage you to stay up-to-date with the latest forage research in Kentucky by subscribing to our online newsletter, Forage News, by visiting www.uky.edu/ag/forage. In addition, you will find a wealth of publications and other resources to help you better manage your forage resources.

Sincerely,

Chris D. Teutsch, Program Chair

Forages at KCA

The Dollars and Sense of Grazing!!!

AGENDA

1:55 PM	Welcome and Introductions-Chris Teutsch, University of Kentucky
2:00-2:15 PM	Forage and Variety Update-Ray Smith, University of Kentucky
2:15-3:00 PM	Profitability at Eldon Farms: Guiding Principles-John Genho, Eldon Farms
3:00-3:45 PM	Economics of Grazing Cover Crops-Ed Ballard, University of Illinois Extension, Retired
3:45-4:30 PM	Five Myths of Grazing-Greg Halich of Grazing, University of Kentucky
4:30 PM	Survey and Adjourn

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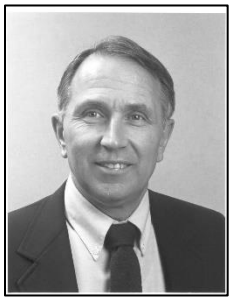
Our Speakers…

Dr. Ray Smith, Extension Professor, Univeristy of Kentucky
Dr. Ray Smith is a native of Georgia and received his undergraduate degree from Asbury University in Kentucky in 1983. After teaching high school biology for two years he entered a graduate degree program in Agronomy and Plant Breeding at the University of Georgia. From 1991-2001, Ray held a research, teaching and extension position at the University of Manitoba, Canada with a focus on alfalfa and native grass breeding, seed production and forage management. He was the Forage Extension Specialist at Virginia Tech from 2001-2004 and is now the lead faculty advisor for the UK Forage Variety testing program coordinated by Gene Olson. It is the largest forage variety testing program in the country. Ray is also the current chair of the Continuing Committee for the International Grassland Congress and past President of the American Forage and Grassland Council. He has published 43 articles in refereed journals, presented 165 papers at professional conferences, written over 120 extension publications, and given over 670 extension presentations. Ray has been the advisor for 16 master's students, 4 PhD's, 5 Post-docs, and 26 senior research students. His current extension activities include working closely with county agents and producers; conducting applied forage research for Kentucky and the transition zone; helping organize state, regional, national, and international forage conferences; and writing applied agricultural publications. His current research projects include: evaluating forage varieties for grazing tolerance and yield, developing forage production systems, pasture evaluation methods, and developing computer and time-lapse photography teaching tools.

John Genho, Farm Manager, Eldon Farms, Woodville, VA
John Genho has served since 2005 as General Farm Manager of Eldon Farms - a 7,000 acre property in the piedmont of Virginia. In this role, John manages the day-to-day operations of a 1,000 head cow/calf and stocker herd, sustainable hardwood timber cuts, and hunting leases. In addition, John specializes in genetic evaluations for beef cattle for Neogen Corporation. Current customers include some of the largest commercial cattle ranches in the United States and the majority of the Brahman-based breed associations. John has a BS in Animal Science from Brigham Young University, an MS in Animal Breeding and Genetics from Cornell University with a minor in biometrics and statistics, and an MBA from Duke University. John currently lives in Woodville, VA with his wife Lynnie and their five children where they have a small cow herd and flock of sheep.



Dr. Edward N. Ballard, Retired Animal Systems Educator, University of Illinois Extension

Dr. Ballard was an animal systems educator who worked with producers and industry groups to enhance farm profitability and sustainability. His areas of specialization include forages and grazing management; nutrition; environmental management; animal care and behavior; fences; energy conservation; nutrient management and economics. Dr. Ballard has taught over 250 Management Intensive Grazing Schools for Illinois producers and is a co-author of the Illinois Grazing Handbook and National Extended Grazing Publications. He has made grazing presentations at the Ohio Forage Council, Western Ohio Grazing School, The Ohio State Extended Grazing Conference, Heart of America Grazing Conferences, Great Lakes International Grazing Conference, University of Kentucky Grazing School, 2nd National Grassland Grazing Conference in Nashville, TN, 3rd National Grazing Conference in St. Louis, MO, Wisconsin Grazing Conference, University of Kentucky Grazing Conference, Missouri Grazing Conference, Missouri Livestock Symposium and Michigan Forage Council. Dr. Ballard coordinated the forage and grazing research and demonstration projects for the University of Illinois Animal Systems team. He represents the University of Illinois on the Great Lakes Grazing Council and the Illinois Grasslands Conservation Initiative Committee. He currently serves as liaison and farm manager for the University of Illinois Dudley Smith Research Farm.

Dr. Greg Halich, Agricultural Economist, University of Kentucky

Dr. Halich works with farmers on profitability evaluation and improvement on livestock and grain farms. Current production focus areas related to livestock include grazing systems, extended season grazing, bale grazing (winter feeding technique that reduces machinery and labor and increases pasture fertility), grass-finished beef, and how to effectively manage fixed costs of production related to haymaking (depreciation and interest). He lives and farms in southern Woodford County where he produces grass-finished beef, corn, and soybeans.

Profitability at Eldon Farms: Guiding Principles

John Genho
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Eldon Farms is a 7,000-acre farm in the Northern Piedmont of Virginia. Over the past 15 years, we have adopted a grazing program based on three principles. While the specifics of each operation are different, I believe these principles can be applied across a host of situations.

First, we decided we needed a quantitative approach to winter grazing. Often we do a quick windshield, eyeball measurement of forages and decide how long a field can last a group of animals. We found these approximations to be lacking in consistency and predictability. Instead, we developed a falling plate meter to actually measure the amount of forage in a field. This was based on work done at WVU by Ed Rayburn.

Figure 1. A falling plate meter more consistently and accurately estimates forage biomass since it compresses the pasture sward to a uniform density. For more information on building and using fall plate meters, see the articles following this one.

Second, we developed a grazing program that built flexibility into winter forages. We have some known quantities…the number of animals we have, the amount of hay, and the amount of forage. But there are always surprises that come up over the course of a winter. We get more snow or less snow. Spring comes earlier than expected. Or the hay we purchased didn't weigh as much as we thought it would. In

addition, we never know how much stockpiled grass we'll have until the start of winter as fall rains are incredibly variable. Somehow, we had to have flexibility in our winter plan to allow us to deal with these risks. Our approach was fixing the amount of forage we attempted to produce and building the flexibility into the number of animals we had on forage at any given time.

As cattle producers, we tend to be risk averse, which is fine. There is no "right" level of risk to have in an operation. As long as there are potential returns to risks, they can be good risks. However, risks taken without potential returns can definitely be labeled as bad risks. Investors call this the efficiency frontier, the point at which a risk has a correlated potential return. One risk that we fail to recognize as cattle producers is the risk of not needing the feed that we work so hard to produce and having it rot in the corner of a field. Often, I believe our risk aversion about winter weather leads us to take "bad" risks by purchasing or putting up too much feed.

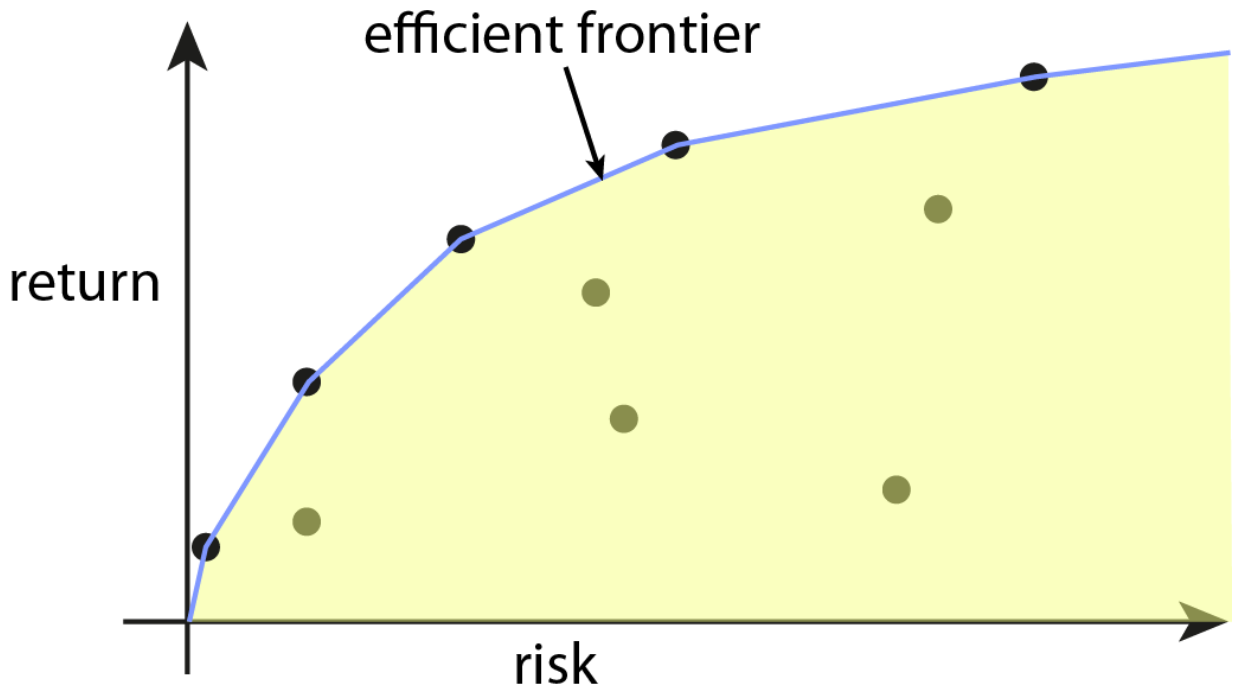

Figure 2. The "efficiency frontier" is the relationship between risk and return. "Bad" risk is risk that yields little or no return. "Good" risk is risk that results in moderate or high rates of return.

And finally, the most important principle that we based our program on was optimizing the financial return of the grazing program, not a biological measurement. As farmers, we often get caught up in biological measurements…how many animals did we graze, how heavy were the calves, etc. Rather than focusing on these measurements, we decided the most important factor was how much we could return on a grazing field. We realized that in our situation, planning on grazing every day of the year was just as wrong financially as feeding 120 days of hay. Both were sub optimum.

Over the course of several years, we ended up varying the number of animals on a particular group of fields from about 90 head up to 235 head. When we had 90 head, we weaned the heaviest calves. When we had 235 head, we produced the most lbs to sell. But neither of these biological maximums created the financial optimum. That number was at 135-140 head. The economic optimum is always under the

biological optimum when it comes to stocking rates. We should always run a few less cows than a field can actually carry to make the most money.

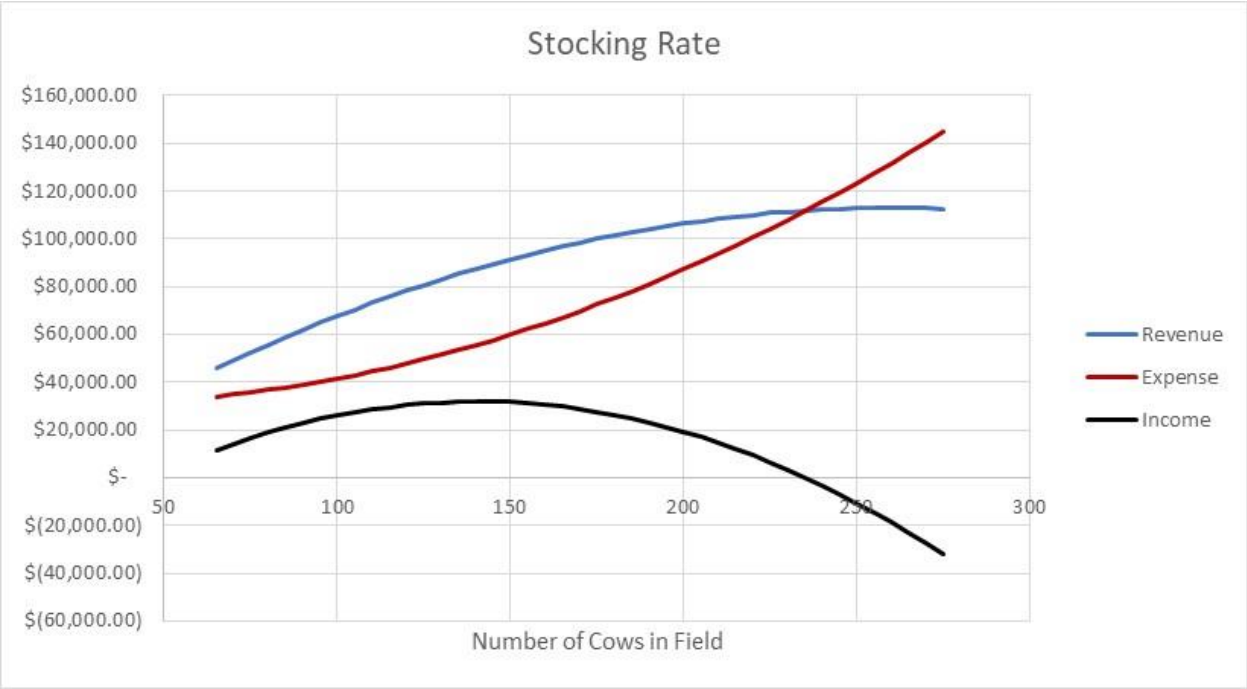

Figure 3. The relationship between stocking rate, revenue, expense, and income. The economic optimum is always below the biological optimum for the system.

As we've used these three principles in our grazing programs, we've seen the results speak for themselves. The farm overall has become more financially viable and the fields have become healthier.

Economics of Grazing Cover Crops

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Feed costs represent the major cost in most livestock production systems. A completed analysis of 225 Standardized Performance Analysis (SPA) Beef Cow Records on herds in Illinois and Iowa showed that feed cost was the overriding factor determining profitability, explaining over 57 percent of the herd-to-herd variation.

Table 1. Eight financial measures capable of explaining over 82% of variation in Return to Land and Management in beef cow enterprise.

DEPENDENT VARIABLE	R2
Feed Cost	.567
Depreciation Cost	.086
Operating Cost	.049
Calf Weight	.046
Capital Charge	.024
Calf Price	.027
Weaning Percentage	.017
Herd Size	.007
Total	.823
A. Miller, R. Knipe, University of Illinois SPA, 2004	

Typically the cost of supplying nutrients to ruminant livestock is much greater using harvested feedstuffs as opposed to grazing pastures or crop residues. The primary function of a grassland farm is to convert solar energy to marketable livestock products in the most efficient manner. The fewer steps between the animal product and the solar energy, typically, the more economically efficient the production systems will be.

Providing grazable forage in a cost-effective manner to the animal for as many days of the year as possible should be the goal of the grazing manager.

Extending Grazing in the Fall and Winter

Several strategies can be employed to supply forage into the fall or early winter and effectively extend the grazing season by 60 to 90 days, thus reducing the need for stored feeds. These strategies can be

categorized into three major groups: 1) utilizing forage crops that continue to grow into the fall and early winter, 2) utilizing crop residues, 3) or stockpiling (conserving cool-season forages in late summer for use in the fall and winter).

Table 2. Daily and seasonal forage costs for alternative wintering strategies at typical yields, costs, and period of use based on 100-cow autumn-calving herd.

Winter feeding period from Dec 1 to April 10				
Forage Source	Hay	Cornstalks	Stockpiled tall fescue	Ryegrass + cereal rye
$/cow/day	$1.32	$0.05	$0.31	$0.61
Days of use	130 hay	60 stalks	90 graze	90 graze
		70 hay	40 hay	40 hay
Wintering cost	$172	$122	$70	$108
SOURCE: Jim Gerrish, University of Missouri.				

Fall Growing Forage

The growth of some forage species is not adversely affected by cooler fall weather and shorter day lengths, as are many cool-season types of forage. The species, which seem to grow best in the fall, are perennial and annual ryegrass, small grain cereal crops such as rye, wheat, oats and triticale, and certain brassica crops like turnips, forage radish, rape, swede and kale.

Small Grains

Winter cover crops on corn and soybean acres are a natural fit for a cropping and livestock system. The winter cover, which can be grasses, legumes, brassicas, forage radishes or a mixture, can help to extend the grazing season for livestock. The use of winter cereal crops such as wheat, rye, spring oats, barley, or triticale can provide fall or early winter grazing opportunities. However, certain management practices need to be modified from what is normally done for grain production. When small grains are used for grazing, plant them three to four weeks earlier than for grain production. In addition, increase the seeding rate and apply nitrogen at the rate of 40 to 60 lb/N per acre at planting time.

Spring oats offer easy transition to spring crop planting as the cereal winter kills. There is no herbicide expense the following spring. In selecting a variety, select a popular variety with higher yield potential. Seeding rates are 3 bushels per acre for straight oats or 1 ½ to 2 bushels per acre in a 2 or 3 species mixture. Spring oats offer some of the highest feed quality for beef cattle.

Table 3. University of Illinois Dudley Smith Farm

Costs –Spring Oats and Turnips	2001	Spring Oats and Cereal Rye	2001
Chisel	$11.00	Chisel	$11.00
Disc and mulch	$ 9.00	Disc and mulch	$ 9.00
Nitrogen-40 units	$12.00	Nitrogen-40 units	$12.00
Seeding costs -Oats	$9.00	Seeding costs –Oats and Rye	$9.00
Spring Oats - 1 ½ bu/acre -$2.00/ bu	$ 3.00	Spring Oats - 1 bu/acre - $2.00/ bu	$2.00
Seeding Turnips	$ 9.00		
Turnip Seed -4 lbs/acre - $1.80 per lb	$ 7.20	Cereal Rye 1 ½ bu per acre - $5.25/ bu	$7.87
Total Costs per acre	$60.20	Spring Oats - 1 ½ bu/acre -$2.00/ bu	$50.87
Total cost for seeding 6.2 acres	$373.24	Total cost for seeding 6.2 acres	$315.40
Winter Costs		Winter Costs	
Hay 4,800 lbs for 8 cows $65/ton	$120.00	Hay 4,800 lbs for 8 cows $65/ton	$120.00
Propane Cost -70 cents per gal	$47.40	Propane Cost -70 cents per gal	$47.40
Total Hay and Propane Costs	$167.40	Total Hay and Propane Costs	$167.40
Total All Costs	$540.64	Total All Costs	$482.80
Cost per cow per day for 126 grazing days	$0.50	Cost per cow per day for 134 grazing days	$0.45
Total cows per cow for grazing and hay-134 days	$67.58	Total cows per cow for grazing and hay-134 days	$60.35
Average daily gain per cow	1.86	Average daily gain per cow	1.55
Seed on August 9, 2001		Seeded on August 9, 2001	

Rye will be more productive than wheat or triticale for both fall and spring production. However, grazing quality will be better with triticale than for rye. Some producers are also choosing triticale over rye because it is easier to manage in the spring. However, with adequate fall moisture, grazing should be available from October through December and then again in early spring for the rye, triticale and wheat. Strip grazing improves efficiency and adds pounds of gain per animal and acres. Also, to reduce stand reduction for rye, triticale or wheat going into the spring keep back grazing to a minimum in the fall.

Stocking rate and time of grazing will be somewhat determined by the intended use of the crop. If you are planning to take a silage or grain harvest, grazing should only be moderate. Heavy grazing can reduce grain yields. Moderate grazing in the fall will not result in significant silage or grain losses provided that

moisture and soil fertility are adequate. In fact, fall pasturing can be beneficial where the small grain was seeded early and has made excessive growth and soil conditions dry.

Spring grazing may be started when growth resumes. If a grain or silage crop is to be harvested, grazing should be discontinued when the plants start to grow erect, just before jointing (growth stage). In much of the USA, winter annuals can be useful in helping provide an extended grazing season. On farms where row crops are grown, they can allow use of cropland for 12 months a year while providing a cover for the cropland during winter. In combination with crop residues and fall growth of annual crops, this can allow livestock grazing to be extended well into the winter months.

Winter annual crops can also be valuable when planted in selected areas on livestock farms where lower quality perennial forages dominate, or in situations in which they can provide grazing at times when it would otherwise not be available. However, because winter annual forages are more costly to grow than most perennials, they may be most economical to use primarily for growing and saleable animals unless mature animals are to be second grazers.

Table 4. Economics of GRAZING SMALL GRAIN CEREAL RYE John Hebert Stocker Rye Grazing Program-35 Acres (Central Illinois)

Expenses and Income	1998	1998 and 1999
Grazing Date		Oct. 8 to Jan. 7
2nd Grazing Date	Feb. 5 to April 15	Feb. 17 to March 29
Number of Stocker Calves	103	79
Cost Per Acre		
Seed	$20.00	$20.00
Labor ($8.00 per hour)	$15.77	$20.77
Machinery	$12.00	$12.00
Tillage for Soybeans	$10.00	$10.00
Fertilizer	$8.00	$8.00
Fencing	$5.00	$5.00
Hay Costs	$30.00	$43.50
Total Cost per acre	$100.77	$119.27
Gains per acre	415	497
Cost of gain per pound	**$0.242**	**$0.146**
Total gains produced	**14,500 lbs**	**2,682lbs**
Average Daily Gain	**2.04 lbs per day**	**2.42 and 2.85**

Brassicas (which include turnips, rape, kale, and swedes) are forbs that are highly productive and digestible and contain relatively high levels of crude protein. Animals will readily consume the tops and will also grub the root bulbs out of the ground. Dry matter yield is variable and highly dependent upon soil type, fertility, time of seeding, and precipitation. However, continuously growing them on the same land may result in a high incidence of crown or root rot within a few years.

Brassicas should not comprise more than 75% of cattle diets because of their low dry matter content. Therefore, it is important to provide adjacent pasture, corn stalks, or a palatable, dry hay free choice to cattle when grazing these crops. Sheep producers, who probably more commonly use these crops than most cattlemen, need to be aware that copper toxicity can be a problem with turnips.

Turnips grow fast and can be grazed as early as 60 to 70 days after planting. They reach near maximum production level in 80 to 90 days. The proportion of top growth for turnips to roots can vary from 90 percent tops and 10 percent roots to 15 percent tops and 85 percent roots depending on the type of turnip.

Rape is more easily managed for multiple (generally more than two) grazing than are the other Brassica species. It takes approximately 110 days of growth for rape prior to grazing. Approximately six to ten inches of stubble should remain after the first grazing of rape, as this practice promotes rapid regrowth. Rape can generally be grazed at four-week intervals. On the final grazing, the plants should be grazed close to ground level.

Swedes, like turnips, produce large edible roots. Swedes yield more than turnips, but require 150 to 180 days to reach maximum production. Swedes are one of the best crops for fattening lambs and flushing ewes. Yield is maximized with a 180-day growth period for many varieties, but most hybrids produce the greatest yields when allowed to grow 60 days before first harvest and 30 days before the second harvest.

Brassicas require good soil drainage, and soil pH should be in the range of 5.5 to 6.8. Brassicas can be seeded into wheat stubble or no-tilled into a sod, provided they have been killed with glyphosate. Clean-till seeding works well but may have increased insect pressure. If seeding after crop farming, herbicide carryover residues can be an enormous problem. As a rule, carry-over label recommendations for sugar beets are usually applicable to most Brassica species. Some producers in the upper Midwest have had success in aerially seeding turnips into standing corn in mid-August. The corn must be physiologically mature for this to be successful. Be sure and check the herbicide used on the corn.

Fertilizer should be applied at the time of seeding to give Brassicas a competitive edge on weeds. Normally 75 to 80 pounds of nitrogen per acre and any phosphorus and potassium needed should be applied similar to what would be applied for a small grain. As with many types of forage, the likelihood of successful establishment is closely correlated with soil moisture availability after seeding. Brassicas are a great second feeder for nutrients following a corn crop and utilize the left over nitrogen. Turnips can be seeded any time from when soil temperature reaches 50 degrees until 60 to 70 days prior to a killing frost. The ideal time for fall seeding is sometime between August 15 to September 15 in Kentucky.

Table 5. Cost of grazing Turnips, Oats, and Cereal Rye

Land Charge, $ /acre	Grazing days/acre/animal units			
	50	100	150	200
$0	1.10	.55	.37	.28
$50	2.10	1.05	.70	.53
$100	3.10	1.55	1.03	.78
3 locations for 3 years, grazing days range from 64 to 213 days per acre, Average 118, A. Miller, J. Sexton, E. Ballard, U of I, 2008				

As with stockpiled forage, Brassicas should be strip-grazed. If regrowth is desired, at least two inches of leaf should be left intact. Generally animals will consume the leafy portion of the plant before progressing to the root portion. In order to get good consumption of roots, it may be necessary to disk after the tops have been grazed.

Ryegrass

As an alternative to the small grain cereals crops some producers have been planting annual ryegrass, Italian ryegrass, or perennial in the fall for late fall, early winter and early spring grazing. Ryegrass is easier to manage, has a higher feed quality, less management problems in the spring compared to cereal rye, and can make great regrowth after initial grazing.

Ryegrass can be easily established into standing corn, or in cornfields or soybean fields after they are harvested; it can also be no tilled into old alfalfa fields or into pasture sod.

Winter hardiness can be a problem for some ryegrass varieties if you want to graze them the following spring. Italian or perennial varieties survive better than annual varieties over the winter.

Seeding rates will vary according to method and combination of seedlings. Seeding rates will vary from 8 to 10 pounds per acre to 30 to 40 pounds per acre. When planted in combination in standing crops 8 to 10 pounds per acre is recommended, when planted as a cover crop 15-20 pounds per acre will be sufficient, or when planted as a grazing crop 30 to 40 pounds per acre is recommended.

Table 6. University of Missouri Animal Gains on Annual Ryegrass, Rob Kallenbach, University of Missouri

Year	Grazing Days	ADG	Total Gain
	Days	Lb/day	Lbs per acre
Year #1	95	1.8	511
Year # 2	83	1.5	314

Summary: According to University of Illinois SPA/IRM Records the average beef cow producer in the State of Illinois spends an average of approximately $1.25 to $1.50 per day for feed costs for beef cows during the winter. The winter feeding period will average between 120 and 150 days. If we can keep a cow for 50 to 60 cents per day versus $1.25 to $1.50 for 120 to 160 days we are talking about reducing the costs for keeping a beef cow between $90 and $140 per cow. This kind of cost advantage can help make the Midwest beef industry very competitive in world beef production.

We just need to do a better job of educating our producers to utilize all of the natural feedstuff that we have available in the Midwest. This includes crop residues, stock piled forages, and winter and summer annual forages. By using winter annuals we can provide a high quality feed at an economical cost to our animals. Using winter annuals can also help improve the health of our soil and reduce potential erosion problems.

References

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E. Soil compaction, corn yield response and soil nutrient pool dynamics within an integrated crop livestock system in Illinois, Benjamin F. Tracy and Yan Ahang, University of Illinois, 2002

Grazing Myths that Reduce Profitability

Greg Halich
Agricultural Economist, University of Kentucky

Many cattle farms have moved to rotational grazing in the past decade, and there are significant benefits associated with this grazing technique. However, one thing that I have noticed is that costs are not always accounted for when it comes to recommended rotational grazing practices. If you ignore costs, partially or fully, you will invariably do too much of whatever you are considering. In this light, I will highlight four grazing recommendations (myths) that many folks are often taking to extremes related to rotational grazing, and one additional myth (generic to grazing style) that is reducing the overall profitability of farms and ranches.

Myth #1 – Cattle Need to be Moved Every Day

Rotating cattle frequently has definite advantages: increased pasture growth, increased forage utilization, and potentially balanced forage intake that does not swing from one extreme to another. Roy Blaser, one of the pioneers in grazing research from Virginia Tech in the 1960's, found the largest improvement in carrying capacity and forage productivity came from going from continuous grazing to a basic three paddock rotational grazing system. Further improvements in carrying capacity were found as subdivisions increased (and period of stay decreased), but these improvements were progressively smaller. Three to four paddocks with weekly moves produced 75% or more of the overall efficiency gains compared to continuous grazing.

There are additional costs as rotation frequency increases, the main one being increased labor, but also potentially additional grazing infrastructure required to handle the more frequent moves such as watering points. The increased labor costs alone will limit the cost-effectiveness of rotation frequency. This is because labor costs increase at a near linear rate (moving every day will have almost twice the labor cost as moving every two days), while the benefits of increased rotation frequency slow down dramatically after the first 3-4 subdivisions.

The challenge is determining when the additional costs exceed the additional benefits for a particular operation as you keep increasing move frequency. The article "How Often Should You Move Your Cattle" in the May 2017 edition of Progressive Forages (http://www.progressiveforage.com/forage-production/management/how-often-should-you-move-your-cattle) provides details on how to estimate this balancing point. The main conclusion was that a one-size fits all approach or recommendation for grazing frequency does not work. One-day moves may in fact be the most profitable for one operation, while one-week moves may be the most profitable for another. In general, the more cattle that you have the more often you can afford to move them.

Myth #2 – Cattle Need to Clean Up the Pasture

There is a natural tendency to think forage left in the pasture after a grazing cycle is wasted. Possibly this is a remnant of the cultural history of this country: "waste not, want not", and other Protestant idioms ingrained into our psyche. Regardless of its origins, insisting on lawnmower-like pastures will have negative effects on profitability.

I have heard too many presentations related to rotational grazing stressing increased utilization, with no mention whatsoever related to animal performance. However, reduced animal performance due to excess forage utilization has been well documented as far back as the 1940's, by another pioneer of grazing dynamics, D.B. Johnson-Wallace at Cornell University. In one of his studies, cattle intake was monitored over a 9-day period. Dry matter intake for cows started out at 32 lbs/day for the first three days, then dropped to 20 lbs/day for the next three days, and finally went to 10 lbs/day for the last three days as cattle cleaned up the pasture. While this particular study looked at a nine day period of stay, the same type of results could have been obtained by using a one or two day move but allocating a corresponding decrease in acreage. The main conclusion of his study was that if you push animals too hard on a pasture to increase utilization, performance will suffer.

While you may increase utilization in the short-run by forcing animals to clean up each paddock, two other dynamics are working against you. First, taking the pasture sward down beyond a point during the growing season will require more carbohydrate reserves to initiate regrowth and reduce overall pasture growth. Second, much of what you might think was "wasted" by the cattle at lower utilization rates would be available in the next grazing cycle. The combined affect is that what may appear to be an increase in pasture utilization in the short-term, will be counteracted to some degree in the long-term, while still having the negative consequences of reduced animal performance. Out of all the myths discussed here, this may in fact be the most costly to the bottom line, and easiest to correct if only we could recalibrate out notion of "waste".

Myth #3 – Never Back-Graze

One of the biggest advantages of going from continuous to rotational grazing is controlling when plants are defoliated and how long they are rested before the next grazing cycle. Not allowing cattle to constantly graze their preferred plants as soon as they are tall enough to wrap their tongue around them, and forcing them to eat plants that they might otherwise avoid in the short-term both make for a more productive pasture.

Once we start rotational grazing, there are two new questions related to back-grazing that are relevant: 1) What is the maximum stay that we can get away with to avoid back-grazing? 2) Can we have some limited amount of back-grazing that does not significantly cut into pasture production? For some die-hard rotational graziers, even asking these questions may amount to heresy, so I will carefully explain my reasoning.

If you give cattle a new pasture allocation with access to the last allocation, you will see virtually no back-grazing on that first day assuming you gave them enough new pasture. The cattle will only start back-grazing as the fresh grass plays out (if you didn't give them enough new pasture). At first, they will start grazing areas that were completely missed in the first round (if available) but will start re-grazing clipped plants as pasture availability diminishes. This second possibility is not ideal, but in my opinion, it is far better than the alternative where cattle intake and performance goes down, potentially drastically if you underestimated how much new pasture they would need.

To be clear, I am not talking about 3-4 paddock systems with 1-2 week moves. I am talking about fairly intense rotations where we are moving at least twice a week. Moving twice a week and providing access to just one previous allocation means the opportunity for regrowth and subsequent re-grazing is at most one week. The more intense your rotations are, the less room for error you have in pasture

allocation if you do not allow back-grazing. You will invariably allocate on the low side on occasion. Would you rather your cattle go hungry and performance suffer, or allow your cattle to back-graze when you mess up?

Myth #4 – Need Water in Every Paddock

In the perfect grazing world, we would all have four-ball permanent water systems in every paddock subdivision. In the real world, we typically have considerably less than this ideal. Water infrastructure can be expensive if you insist on having permanent water in every paddock. Another option is moving a small portable tank to each paddock. This latter option may sound inexpensive, but if you account for the additional labor, as well as the occasional major water leaks that will inevitably occur with this type of system, the true cost in most cases will be surprisingly high.

Having the ability to back-graze the previous 1-2 pasture allocations gives you a tremendous amount of flexibility related to water supply. Having a few permanent water points that will not freeze for winter grazing combined with a few more semi-permanent water points set up during the growing season can provide most of the benefits of a Cadillac system as long as you are flexible in allowing limited back-grazing to get to these water points.

Myth #5 – You Should be Grazing 365 Days a Year

There are many cattle farms and ranches that could be more profitable by feeding less hay. However, there are also farmers and ranchers out there who in recent years have likely swung too far to the other side of the pendulum. The amount of hay that is most profitable will depend on a number of factors, the two most important being the base profitability of the enterprise and the net hay cost. The higher the base profitability the more hay feeding days that are desirable, and the higher the net hay cost the less hay feeding days that are desirable. The specifics with example scenarios and results are detailed in the article "Picking Apples Off the Grazing Tree: The Stocking Rate – Hay Feeding Trade-Off" in the November 2017 edition of Progressive Forages (https://www.progressiveforage.com/forage-production/management/picking-apples-off-the-grazing-tree-part-iii-the-stocking-rate-hay-feeding-trade-off).

There are very plausible examples where zero hay feeding days would in fact be most profitable, but there are also very plausible examples where 150 or more hay feeding days per year would be most profitable. In the current market environment for an average cow-calf operation, 60-90 days of hay feeding is likely a good target. However, you need to know the specifics of the particular operation (hay cost and base profitability) before you can determine this with certainty. Base your hay-feeding days and other grazing practices on analysis, not faith.

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UK Research Spotlight

Simplifying Grain Drill Calibration
J.M. Buckman, H. Adams, and C.D. Teutsch

Performance of Stockers Grazing Diverse Summer Annual Forage Mixtures
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Nitrogen Application on Diverse Summer Annual Forage Mixtures
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Cultivar X Aphicide Interactions
C.D. Teutsch, R.T. Villanueva, Z.J. Vilora, G.L Olson, and S.R. Smith

Using Summer Annuals to Transform Forage Systems in Western Kentucky
H. Adams, J.M. Buckman, and C.D. Teutsch

Can Targeted Management Reduce Nimblewill in Pastures?
K. Lea and S.R. Smith

Nutritive Value and Dry Matter Yield of reduced-Lignin Alfalfa in Grass Mixtures
S.R. Smith, J.H. Cherney, C.C. Sheaffer, D.J.R. Cherney, and M.S. Wells

Using the Kentucky Forage Council Board to Set University of Kentucky Extension Programming and Agent Training Priorities
J. Henning, S.R. Smith, C. Teutsch, and T. Missun

SIMPLIFYING GRAIN DRILL CALIBRATION

J.M. Buckman, H. Adams, and C.D. Teutsch[1]

Grain drill calibration is a critical, yet often ignored part of successful forage establishment and pasture renovation. Planting lower seed rates than recommended can result in thin stands that are susceptible to weed encroachment. Planting more than the recommended seeding rate is undesirable due to the high seed cost of improved forage varieties. Most farmers just use the seeding chart that is already on their grain drill. As drills wear, and tires and cogs get replaced, actual seeding rates can vary significantly from seeding charts found on drills. We have designed a simple and straight forward calibration method that can be applied across a wide range of grain drill types and manufacturers. This method is centered on a pre-made chart that allows producers to determine the quantity of seed to catch for each disk opener for a desired seeding rate. This minimizes the need for producers to carry out detailed mathematical calculations. In order to calibrate the drill using this method, you will need the following items: a container to catch the seed; tape measurer to determine the circumference of the drive wheel and the disk opener spacing; flags to mark stopping and starting points for in field calibration; a floor or bottle jack for stationary calibration; and a gram scale with 0.1 gram accuracy. This procedure and chart were made into a decal that can be affixed to grain drills. This decal has been distributed to counties and Soil and Water Conservation districts in Kentucky that have drills that are loaned or rented. A copy of the procedure/chart and an informational video can be found UK Master Grazer Webpage.

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SIMPLIFYING GRAIN DRILL CALIBRATION

J.M. Buckman[1], H. Adams[1], C.D. Teutsch[2], and B. Volland[2]
[1]Murray State University and [2]University of Kentucky

COLLEGE OF AGRICULTURE, FOOD AND ENVIRONMENT
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Kentucky Master Grazer Educational Program

KADF

INTRODUCTION

- Grain drill calibration is critical, yet often ignored
- Low seeding rates result in thin stands and increased weeds
- High seeding rates increase seed cost

OBJECTIVE

To develop a calibration method that can be used for all drill makes and easily implemented in the field.

CALIBRATION PROCEDURE

STEP 1: Make sure seed tubes are clear using an air hose.

STEP 2: Determine number of times to turn drive wheel for 150 ft of drill travel.

STEP 3: Disconnect seed tubes and place bags on tubes using rubber bands.

STEP 4: Using the table below, determine grams of seed to catch per disk opener. See example below.

	Seeding Rate in lb/A																						
Distance between Disk Openers	**2**	**4**	**6**	**8**	**10**	**12**	**14**	**16**	**18**	**20**	**25**	**30**	**35**	**40**	**50**	**60**	**80**	**90**	**100**	**120**	**140**	**160**	**180**
inches	grams of seed/disk opener to catch in in 150 ft																						
6	1.6	3.1	4.7	6.3	7.8	9.4	10.9	12.5	14.1	15.6	19.5	23.5	27.4	31.3	39.1	46.9	62.5	70.4	78.2	93.8	109.4	125.1	140.7
7	1.8	3.6	5.5	7.3	9.1	10.9	12.8	14.6	16.4	18.2	22.8	27.3	31.9	36.5	45.6	54.7	72.9	82.0	91.1	109.4	127.6	145.8	164.1
7.5	~~2.0~~	~~3.9~~	~~5.9~~	~~7.8~~	~~9.8~~	~~11.7~~	~~13.7~~	~~15.6~~	~~17.6~~	~~19.5~~	24.4	29.3	34.2	39.1	48.9	58.6	78.2	87.9	97.7	117.3	136.8	156.3	175.9
8	2.1	4.2	6.3	8.3	10.4	12.5	14.6	16.7	18.8	20.9	26.1	31.3	36.5	41.7	52.1	62.6	83.4	93.8	104.3	125.1	146.0	166.8	187.7

MATERIALS NEEDED

- Tape measure, gram scale, sandwich bags, rubber bands, screwdriver, pliers, and air hose

MURRAY STATE UNIVERSITY

Step 5: Turn drive wheel to collect seed.

Step 6: Weigh seed.

SUMMARY

This procedure simplifies calculations and increases the likelihood that farmers will calibrate drills.

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PERFORMANCE OF STOCKERS GRAZING DIVERSE SUMMER ANNUAL FORAGE MIXTURES

K.M. Mercier, C.D. Teutsch, S.R. Smith, E.L. Ritchey, K.H. Burdine, and E.S. Vanzant[1]

Retaining calves on summer pasture provides an opportunity to add extra gain before selling at a more opportune late summer market. The dominant perennial cool-season forages in the Mid-South often have insufficient quality and yield to support desired summer gains. In contrast, summer annual forages have both improved production and nutritive value during the summer months. In 2017 and 2018, A study was conducted near Princeton, where calves (725 lb in 2017 and 806 lb in 2018) grazed one of three summer annual forage treatments: 1) sorghum-sudangrass monoculture, 2) simple mixture (three species), and 3) complex mixture (12 species). Due to differences in grazing management, results varied by year ($P < 0.04$). In 2017, calves grazing the simple mixture and the monoculture gained 1.74 lb/day while calves grazing the complex mixture gained 1.46 lb/day ($P < 0.03$). In 2018, no differences in average daily gain were detected among treatments and the calves only gained 0.02 lb/day. The low average daily gains in 2018 were likely due to higher nutritional demand of heavier calves and the lower nutritive value of more mature forage. Keeping summer annual forages in a vegetative state is paramount to maintaining adequate gains during the summer months. The yield and nutritive value of the mixtures will be reported.

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Performance of Stockers Grazing Diverse Summer Annual Forage Mixtures

K.M. Mercier, C.D. Teutsch, S.R. Smith, E.L. Ritchey, K.H. Burdine, and E.S. Vanzant
University of Kentucky

Introduction

- Retaining calves on summer pasture provides an opportunity to add extra gain before selling at a more opportune late summer market
- Compared to cool-season pastures, managed summer annual forages improve production and nutritive value during the summer months
- Increasing botanical diversity of summer annual pastures may offer opportunities to improve forage yield and nutritive characteristics, which could influence calf gains

Objective

To evaluate forage and animal performance of weaned calves on summer annual pastures of varying species complexity

Materials & Methods

- Three forage mixtures planted in 2017 & 2018
  - **Monoculture** = sorghum x sudangrass (SS)
  - **Simple** = SS, pearl millet, & soybean
  - **Complex** = Simple + corn, sudangrass, crabgrass, cowpea, sunn hemp, Korean lespedeza, forage rape, daikon radish, & sunflower
- Randomized complete block design with 3 reps
- 5-7 calves (2017: 726 lb; 2018: 806 lb) strip grazed pastures for 30-45 days with only mineral supplement

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College of Agriculture, Food and Environment

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Ramer Seed, Sharon Grove, KY

A special thank you to Jesse Ramer for supplying the seed for this study.

Figure 1. Calf ADG response to forage mixtures. Treatments within a year with the same letter are statistically similar (α = 0.10).

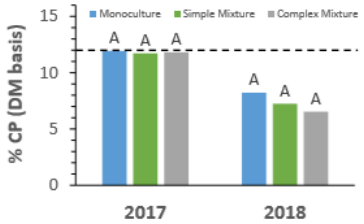


Figure 2. Crude protein response to mixtures. Treatments within a year with the same letter are statistically similar (α = 0.10). Line denotes the CP requirement for a growing steer to gain 1.5 lb/d.

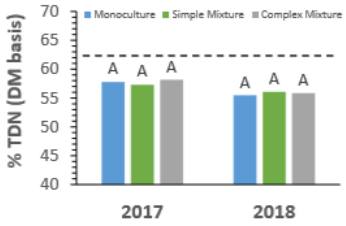
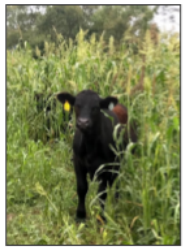


Figure 3. Total digestible nutrients response to mixtures. Treatments within a year with the same letter are statistically similar (α = 0.10). Line denotes the energy requirement for a growing steer to gain 1.5 lb/d.

Results

- Forage height at onset of grazing: 30 in (2017) and 72 in (2018)
- Calves gained 0.3 lb/day more on monoculture and simple mixtures versus complex mixtures in 2017
- Simple mixtures were dominated by SS, while complex mixtures had a more diverse sward
- Nutritive evaluations were conducted on the whole plant, potentially underestimating quality
- Plenty of residue was trampled which will contribute to nutrient cycling, but likely decreased the utilization rate
- Korean lespedeza, sunflower, brassicas, and sunn hemp made minor contributions to biomass yields



Summary & Implications

- Forage maturity reduced nutritive value and adversely affected calf gains in 2018
- Lower CP may have decreased fiber utilization in the rumen
- Protein supplementation may have increased animal performance in 2018
- Forthcoming analyses will indicate environmental and economic implications of these three systems

NITROGEN APPLICATION ON DIVERSE SUMMER ANNUAL FORAGE MIXTURES

K.M. Mercier, C.D. Teutsch, S.R. Smith, E.L. Ritchey, K.H. Burdine, and E.S. Vanzant[1]

Increasing biodiversity has often been linked to increased productivity, especially when including legumes. However, in annual systems legumes may not always supply nitrogen to associated plants during the growing season. For this reason, an experiment was conducted at two sites [Princeton, KY (Zanesville silt loam with a fragipan), and Lexington, KY (Bluegrass-Maury silt loam)] to evaluate the effects of nitrogen (0, 50, 100, 150, and 200 lb N/A) application on summer annual forage mixtures of varying botanical diversity (sorghum-sudangrass monoculture, simple mixture (three species), and complex mixture (12 species)). Plots were harvest three times in 2018. In Lexington, both mixtures out-yielded the monoculture (5210 vs 4740 lb DM/A, $P < 0.001$), while in Princeton, forage mixture had no effect on yield (3560 lb DM/A, $P > 0.5$). Applied nitrogen increased yields of Lexington plots (5170 vs 4250 lb DM/A, $P < 0.001$), while Princeton plots showed a positive linear trend in response to N (2670-5000 lb DM/A, $P < 0.001$). At both locations, mixture had no effect on crude protein (CP) or total digestible nutrients (TDN) ($P > 0.09$). Increasing N application increased CP in both Lexington (15-18%, $P < 0.001$) and Princeton (8-11%, $P < 0.001$) and TDN at both locations (Lexington: 60-62%, $P < 0.001$; Princeton: 58-60%, $P < 0.001$). Results from this study indicate that summer annual forage mixtures have the potential to outyield monocultures, and up to 200 lb N/A can help improve forage nutritive characteristics; however, results may be dependent upon soil type and weather.

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Nitrogen Application on Diverse Summer Annual Forage Mixtures

K.M. Mercier, C.D. Teutsch, S.R. Smith, E.L. Ritchey, K.H. Burdine, and E.S. Vanzant

University of Kentucky

Introduction

- Increasing biodiversity has often been linked to increased productivity, especially when including legumes
- However, in annual systems, legumes may not always supply N to associated plants during the growing season
- Therefore, there is uncertainty when making nitrogen recommendations on diverse summer annual forages

Objective

To evaluate the response of botanically diverse forage mixtures to increasing rates of N fertilizer

Materials & Methods

- Three forage mixtures planted
  - **MONOCULTURE** = sudangrass (SG)
  - **SIMPLE** = SG, pearl millet, & soybean
  - **COMPLEX** = Simple + corn, sudangrass, crabgrass, cowpea, sunn hemp, Korean lespedeza, forage rape, daikon radish, & sunflower
- Total N rates of 0 – 200 lb N/A was applied between planting & after 1st and 2nd harvests
- Two locations (RCBD with 4 reps):
  - Lexington, KY (Bluegrass-Maury silt loam)
  - Princeton, KY (Zanesville silt loam with a fragipan)
- Harvested 3 times in 2018

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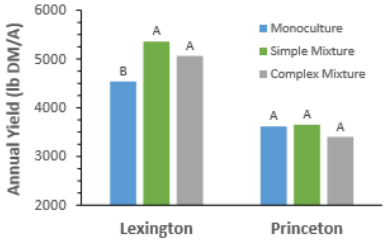

Figure 1. Impact of mixture on annual forage yield averaged across N rate. Treatments within a location with the same letter are statistically similar (α=0.05).

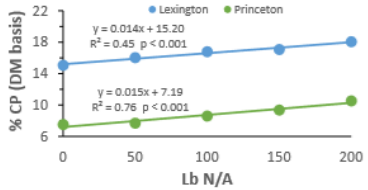

Figure 3. Impact of N rate averaged over mixtures on forage crude protein at two locations.

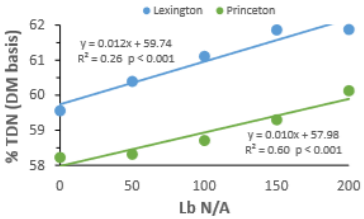

Figure 4. Impact of N rate averaged over mixtures on total digestible nutrients at two locations.

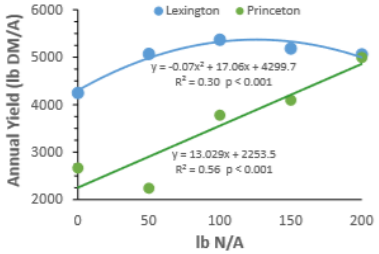

Figure 2. Impact of N rate on annual forage yields averaged across mixtures at two locations.

Table 1. Impact of N rate on the yield of individual species within the simple and complex mixtures at Lexington and Princeton.

	N Application Rate (lb N / A)						
	0	50	100	150	200	Standard Error	P value
	---- lb DM / A ----						
Lexington							
Simple							
Sudangrass	2917	3622	3340	3477	3674	326	0.51
Pearl Millet	1540	1736	2452	1716	1808	340	0.42
Soybeans	41	46	55	82	59	13	0.27
Weeds	52	38	41	62	39	22	0.92
Complex							
Sudangrass	2546	3333	2639	2813	2807	370	0.62
Pearl Millet	1484	1567	2198	2136	2094	342	0.45
Soybeans	36	11	19	31	37	10	0.36
Weeds	19	15	18	11	43	20	0.81
Corn	45	85	152	195	78	95	0.80
Crabgrass	31	33	22	17	23	10	0.77
Cowpea	61	33	52	42	35	17	0.77
Sunflower	23	25	137	21	11	24	0.02
Sunn Hemp	15	14	40	31	18	15	0.70
Daikon Radish	28	32	21	20	36	12	0.85
Forage Rape	8	18	13	3	10	8	0.83
Korean Lespedeza	10	3	4	7	2	2	0.02
Princeton							
Simple							
Sudangrass	2517	2376	3368	3706	3939	398	0.06
Pearl Millet	143	100	368	503	595	66	< 0.001
Soybeans	49	104	37	45	27	19	0.09
Weeds	75	43	48	180	34	45	0.20
Complex							
Sudangrass	1975	1428	3015	2700	4426	347	0.002
Pearl Millet	174	162	497	336	614	69	0.005
Soybeans	55	45	50	20	34	14	0.44
Weeds	13	14	20	15	34	10	0.70
Corn	9	6	14	63	0	22	0.34
Crabgrass	152	94	213	380	197	70	0.11
Cowpea	46	54	31	18	61	13	0.23
Sunflower	5	33	85	10	8	25	0.21
Sunn Hemp	41	42	22	34	46	18	0.91
Daikon Radish	0	0	0	0	0	-	-
Forage Rape	4	0	6	0	2	4	0.69
Korean Lespedeza	33	27	17	19	24	7	0.49

Results

- Forage mixtures responded differently at the Princeton and Lexington locations
- N more greatly increased yields at Princeton as compared to Lexington
- Mixture had no effect on CP & TDN at both locations (p > 0.09; data not shown)
- Location differences were more pronounced for CP than TDN

Summary & Implications

- Yield benefits when growing diverse forage mixtures may depend upon location, soil type, and weather
- Higher N rates increased yield on soils with lower amounts of plant available nitrogen
- Forthcoming economic analysis will recommend optimum N application for mixtures at each location

A special thank you to Jesse Ramer for supplying the seed for this study.

CULTIVAR X APHICIDE INTERACTIONS

C.D. Teutsch, R.T. Villanueva, Z.J. Vilora, G.L Olson, and S.R. Smith[1]

Forage sorghum (*Sorghum bicolor* (L.) Moench) could provide a drought tolerant alternative to corn (*Zea mays* L.) for silage production in the upper Southern U.S. However, a new pest of sorghum, the sugarcane aphid (*Melanaphis sacchari* (Zehntner) (Hemiptera: Aphididae), could restrict its use. The objectives of this study were to document of tolerance of forage sorghum cultivars to the sugarcane aphid and to evaluate the efficacy of an aphicide on these same cultivars. In May 2018, cultivars were planted at University of Kentucky's Research and Education Center at Princeton. The experimental design was a randomized complete block with split plot treatment arrangement and four replications. Sivanto (Flupyradifurone) aphicide was applied at a rate of 6 oz/A on 24-Aug-18 as a drench. In late September, plots were rated for sugarcane aphid damage using a scale of 1 to 9, with 1 being little or no damage and 9 being severe damage. Sugarcane aphid damage was less in plots treated with the aphicide ($P < 0.01$), although the range of the difference was smaller than anticipated (6.3 versus 9.7). Cultivars also differed in sugarcane aphid damage ($P < 0.10$), with a range of 5.7 to 8.3. There was no aphicide x cultivar interaction for the damage rating ($P > 0.70$). The use of aphicides will likely be required in the short-term for management of sugarcane aphids in forage sorghum. However, selection of varieties with increased tolerance to the sugarcane aphid may provide a simple and cost effective approach to management in the future.

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MANAGING THE SUGARCANE APHID IN FORAGE SORGHUM: CULTIVAR X APHICIDE INTERACTIONS

C.D. Teutsch, R.T. Villanueva, Z.J. Viloria, G.L Olson, and S.R. Smith, *University of Kentucky*

INTRODUCTION

- Corn silage yield is sensitive to temperature and water stress
- Forage sorghum has a higher level of drought tolerance
- Sugarcane aphid (*Melanaphis sacchari*) could restrict its use

OBJECTIVES

To document the tolerance of forage sorghum cultivars to the sugarcane aphid and the efficacy of an aphicide for aphid control on these cultivars.

MATERIALS AND METHODS

- Conducted at UKREC, Princeton
- RCB with split block treatment arrangement and four replications
  - ➢ Whole plot: aphicide
  - ➢ Split plot: forage sorg. cultivars
- Planted in 30 in rows in late-May
- 150 lb N/A at planting
- Sivanto at 6 oz/A on 24-Aug-18
- Plots rated for aphid damage on a scale of 1 to 9 (Sharma et al., 2013)

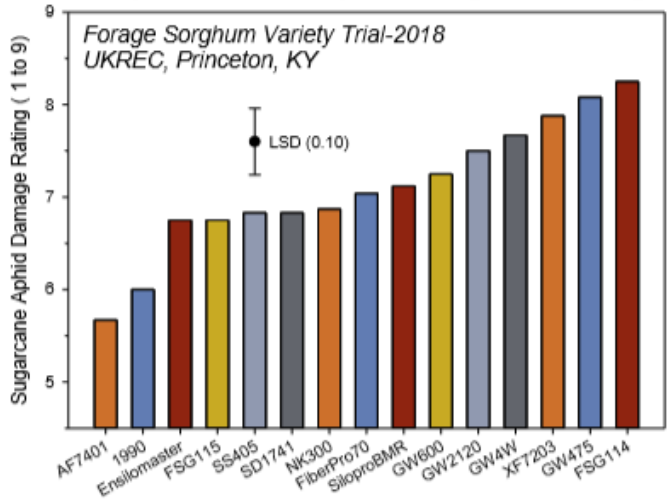

Figure 1. Sugarcane aphid damage rating averaged over aphicide applications for 15 forage sorghum varieties grown in Princeton, KY in 2018. The upper one-third of the canopy was rated on a scale of 1 to 9, with 1 being no damage and 9 being severe damage.

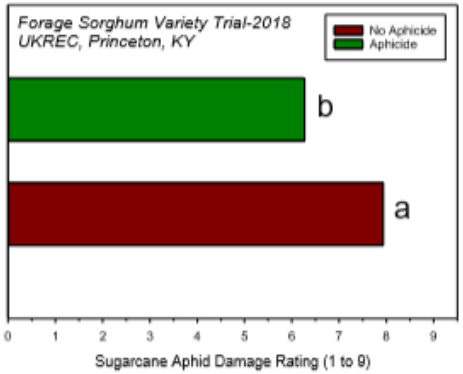

Figure 2. Sugarcane aphid damage rating as impacted by aphicide application at Princeton, KY in 2018. The upper one-third of the canopy was rated on a scale of 1 to 9, with 1 being no damage and 9 being severe damage.

SUMMARY

- Aphid damage differed between cultivars ($P < 0.001$)
- Aphid damage was reduced in treated plots ($P < 0.01$)
- No aphicide x cultivar interaction occurred ($P > 0.65$)
- Although levels of beneficial insects were high, they were unable to control aphids
- In the short-term, aphicides will likely be needed
- In the long-term, selection of cultivars that have tolerance may provide a simple and cost-effective approach

Figure 3. Sugarcane aphid damage. The untreated plots are on the left and the untreated on the right.

Figure 4. Beneficial insects were present at high rates. In this photo lady bug and lacewing larvae are preying in the aphids.

Contact: C.D. Teutsch, chris.teutsch@uky.edu

COLLEGE OF AGRICULTURE, FOOD AND ENVIRONMENT
Grain and Forage Center of Excellence

USING SUMMER ANNUALS TO TRANSFORM FORAGE SYSTEMS IN WESTERN KENTUCKY

H. Adams, J.M. Buckman, and C.D. Teutsch[1]

Forage systems in transition area between the temperate north and subtropical southern U.S. are based on cool-season grasses that are productive grazing during the spring and fall, but have limited growth during the summer months. In contrast, warm-season annual grasses and legumes are highly productive during the summer months. The objectives of this project were to introduce cattle producers to improved summer annual cultivars and to demonstrate how they could fit into forage systems in Western Kentucky. Working with local extension agents, the demonstrations were conducted on five farms in Western Kentucky. In late May and early June, a BMR sudangrass (var. 'AS9302'), a pearl millet (var. 'Wonderleaf'), a forage soybean (var. 'Large Lad'), and mixture of three were planted in 2-acre strips on each of the five farms. When the plots reached 30 to 40 inches in height, they were sampled for yield and nutritive value and grazing was initiated. The demonstration areas were subdivided with temporary fencing and rotationally stocked. Averaged over locations, sudangrass, pearl millet, forage soybean, and the summer annual mixture yielded 5,138, 5,259, 2,234, and 4,654 lb DM/A, respectively. At three of the five locations, a summer field day was held to highlight the use warm-season annuals in grazing systems. Data will be presented this winter at local extension meetings.

[1]Hunter Adams, Agricultural Systems Technology, Murray State University, Murray, KY (hadams@murraystate.edu); Undergraduate Student, Animal Science, Murray State University, Murray, KY (jbuckman@murraystate.edu); Associate Extension Professor, Dept. of Plant and Soil Sciences, University of Kentucky, Lexington (chris.teutsch@uky.edu).

USING SUMMER ANNUALS TO TRANSFORM FORAGE SYSTEMS IN WESTERN KY

H. Adams[1], J.M. Buckman[1], and C.D. Teutsch[2]

[1]*Murray State University* and [2]*University of Kentucky*

INTRODUCTION

- Perennial cool-season grass growth is limited by high temps
- Summer annuals could provide high quality forage
- Summer annuals could be used as transition between perennial sods

OBJECTIVE

To introduce improved summer annual cultivars and demonstrate their use as part of a pasture renovation program.

MATERIALS AND METHODS

- Conducted in five counties in W. KY
- RCB design with counties serving as replications (5)
- Planted in late May & early June:
  1) Sudangrass (SG), 'AS9302'
  2) Pearl Millet (PM), 'Wonderleaf'
  3) Soybean (SB), 'Large Lad'
  4) SG-PM-SB (Mixture)
- 60 lb N/A at planting
- Sampled for yield and nutritive value at height of 30 to 40 in

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Contact: H. Adams, hadams7@murraystate.edu

RESULTS

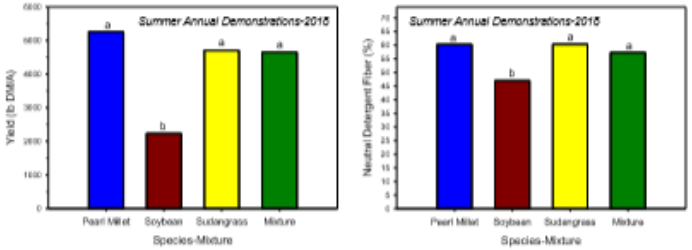


Figure 1 and 2. Yield and neutral detergent fiber of pearl millet, soybean, BMR sudangrass, and a mixture of the three, averaged over five locations in Western Kentucky.

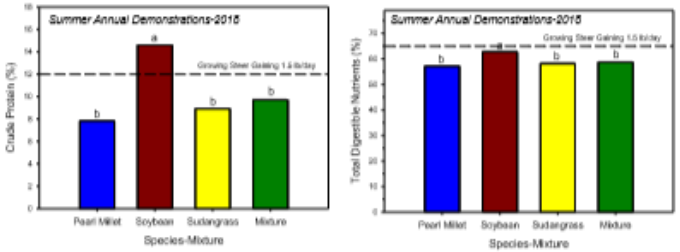


Figure 3 and 4. Crude protein (CP) and total digestible nutrients (TDN) of pearl millet, soybean, BMR sudangrass, and a mixture of the three, averaged over five locations in Western Kentucky.

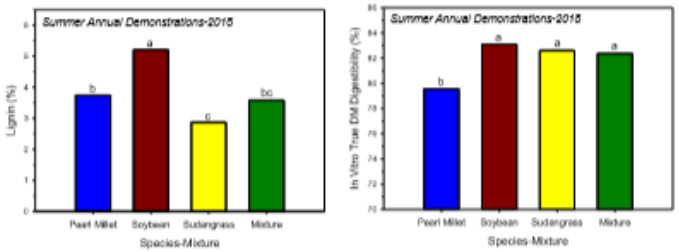


Figure 5 and 6. Lignin and 48-hr in vitro true dry matter digestibility (IVTDMD48) of pearl millet, soybean, BMR sudangrass, and a mixture of the three, averaged over five locations in Western Kentucky.

SUMMARY

- Plant height at sampling ranged from 2.2 for SB to 4.2 ft for PM
- Yield at sampling ranged from 1.1 to 2.6 ton DM/A
- Protein in PM, SG, and MIX was deficient for a growing calf
- Energy (TDN) was deficient for a calf gaining 1.5 lb/day
- Lignin was highest in SB and lowest in the BMR SG
- 48 hour-in vitro true dry matter digestibility was lower for PM
- Summer annuals can be used as part of renovation programs
- Nutritive value should be monitored to ensure adequate animal performance

Figure 7. Interns, Hunter Adams and Jessica Buckman, with local extension agent, Darrell Simpson and producer, Mike Putmam in Hopkins County, KY.

Kentucky Master Grazer Educational Program

KADF KENTUCKY AGRICULTURAL DEVELOPMENT FUND

MURRAY STATE UNIVERSITY

A special thank you to Jesse Ramer for supplying the seed for these demonstrations.

Can Targeted Management Reduce Nimblewill in Pastures?

Krista Lea and S. Ray Smith
University of Kentucky, Dept. of Plant and Soil Sciences

Introduction

Nimblewill, *Muhlenbergia schreberi*, is a warm season, perennial grass, native to central Kentucky and known for its aggressive growth in grazed pastures. Livestock, including horses, cattle and goats, are not known to consume nimblewill, leaving it to persist and spread in pastures unchecked. Currently, there are no herbicides labeled for pasture use in Kentucky to control this grass. Tall fescue *(Festuca arundinacea)* has been shown to out-compete nimblewill in potted greenhouse studies (Moraes et al., 2014). A 1987 study of three *muhlenbergia* species found that biomass production is reduced when light is also reduced (Smith and Martin). The objectives of this study were to evaluate the use of competitive species and altered mowing heights to reduce the growth of nimblewill in pastures.

Fig. 1 Nimblewill survived an application of *imazapic* to remove tall fescue from a pasture.

Photo: Dr. Jesse Morrison

Materials and Methods

Plots were located on working horse farms in Fayette and Woodford counties. Treatments included seeding tall fescue (TF), perennial ryegrass (PR), white clover, *Trifolium repens*, (WC), or an unseeded control (C) in a randomized complete block design. Plots were perpendicularly sub-divided by mowing heights of Low (3-4 inch), High (8-10 inch), or Hay (unmowed but harvested once). Subplots measured 5ft x 18ft in Fayette county and 5ft x 22ft in Woodford county.

Plots were fertilized and seeded in September of 2017 and mowed every two weeks, May – September of 2018. For each monthly observation period, three 4ft^2 areas per subplot were Visually Estimated for nimblewill presence. At the beginning and end of the study, three 1ft^2 samples were collected per subplot and hand separated by species to measure biotanical composition on a dry weight, Biomass basis (figure 5).

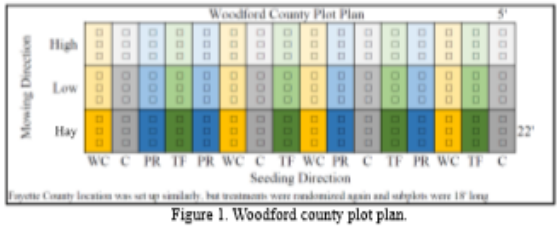
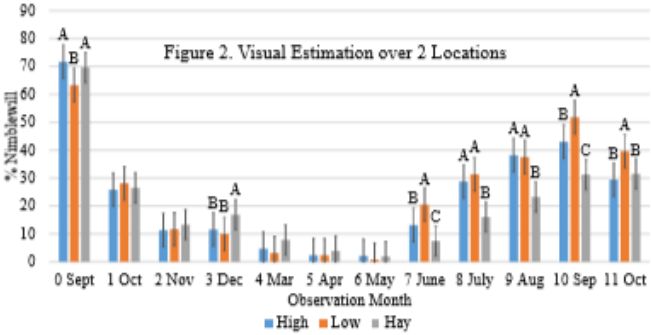


Figure 1. Woodford county plot plan.

Several complicating factors affected this study. The seeder used was not able to accurately distribute such a small amount of white clover seed evenly across the plots. At the Woodford county location, previously seeded orchardgrass grew aggressively in the plots, potentially adding more shade and competition. At the Fayette county location, a herbicide application in the fall of 2017 was accidently applied on the plot area, therefore removing all white clover.

Results and Discussion

Data was analyzed using JPM (JMP Statistical Discovery from SAS, Buckinghamshire) as a randomized complete block, split plot design with $p<0.05$ considered statistically significant and location was treated as a random effect. For Visual Estimation, species seeded was not significant, but a Observation*Cutting Height interaction was observed. Figure 2 illustrates the mean % nimblewill from each observation at the High, Low and Hay cutting heights. Plots were largely uniform before mowing treatments began. Shortly after mowing treatments began in May of 2018, differences were observed. In three of the last five monthly observations, the High mowing subplots contained less nimblewill than the Low. In all five monthly observations, the Hay subplots contained less nimblewill than the Low mowed subplots. This suggests that shading from high cutting heights has the potential to reduce nimblewill in pastures. This is partly supported by the hand separated Nimblewill Biomass data in Figure 3. While no differences were seen in Fayette county, Woodford county demonstrated significant differences, with the Hay treatment having significantly reduced nimblewill biomass. However, the High cutting treatment had more nimblewill biomass than the Low, which contradicts the finding from Visual Estimation data.



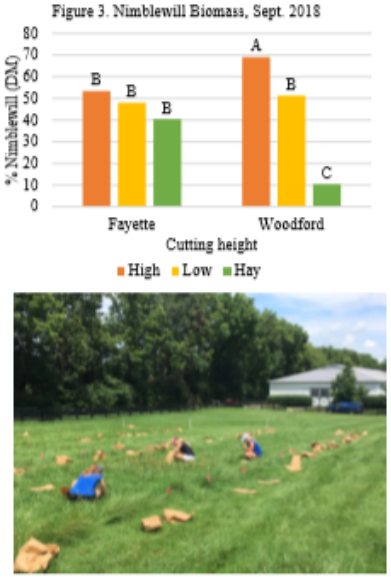


Figure 5. Students harvesting Nimblewill Biomass samples in Fayette county, August 2018.

Conclusion and Future Work

This study suggests that increasing canopy height on farms could reduce nimblewill in pastures. However, this study was limited to 1 year and only 2 locations. More controlled studies are needed to validate these results. At this time, a complementary greenhouse study is planned for 2019 to evaluate the amount of shade needed to reduce nimblewill using varied shade cloth.

Acknowledgements

The authors would like to thank the cooperating horse farms in Woodford and Fayette counties, who asked to remain anonymous. Plot set up was assisted by Gene Olson and Gabriel Roberts. Undergraduate students involved in this project included Becca Puglisi, Audrey Johnson, Alex Teutsch, Emma Lynch, Sarah Rhodes, and Haley Zynda. Statistical analysis was conducted by Dr. Dwight Seman.

References

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Moraes, Pedro V.D., William W. Witt, Timothy D. Phillips, Patricia Rossi and Luis E. Panozzo. 2014b. Relative Competitiveness of Nimblewill (*Muhlenbergia schreberi*) with Tall Fescues and Kentucky Bluegrass. American Journal of Plant Sciences. Vol. 5, pp3777-3787.

Smith, Marian and Craig E. Martin. 1987. Growth and Morphological responses to Irradiance in Three Forest Understory Species of the C4 Grass Genus *Muhlenbergia*. Bot. Gaz. 148(2) 141-148.

seeblue

NUTRITIVE VALUE AND DRY MATTER YIELD OF REDUCED-LIGNIN ALFALFA IN GRASS MIXTURES

S.R. Smith, J.H. Cherney, C.C. Sheaffer, D.J.R. Cherney, and M.S. Wells[1]

Introduction:
New reduced-lignin alfalfa cultivars and higher nutritive value grass species are now being marketed and provide an opportunity for farmers to increase forage quality and profitability.

Objective:
This research assessed the yield and nutritive value of reduced-lignin alfalfa (Hx14376) vs. standard alfalfa (WL 355.RR) in monoculture and binary mixtures with three perennial grasses (Fojtan festulolium, BARFpF32 meadow fescue, and Dividend VL orchardgrass).

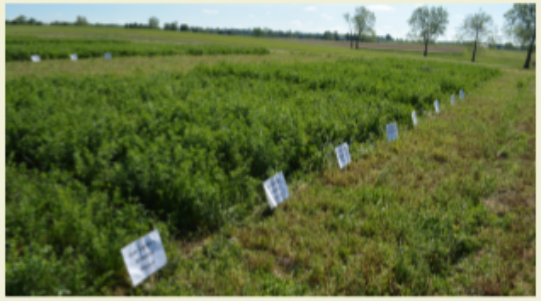

Figure 1. Alfalfa and alfalfa/grass mixtures in KY.

Materials and Methods:
The forages were seeded into prepared seedbeds on University farms in the spring of 2016 [mid-April Ithaca, NY (Cornell), late-March Lexington, KY (Univ. of KY) and late May Rosemount, MN (Univ. of MN)]. Alfalfa cultivars were Roundup Ready with 4 FD rating and harvests taken at the bud and flower stages (2016-spring 2018). In Table 1 averages were weighted for DM yield over 2 cuts in 2016; over 3, 4, or 5 cuts in 2017; and from one spring harvest in 2018.

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Table 1. Alfalfa nutritive value for reduced-lignin (Hx14376) and standard alfalfa (WL355RR) cultivars in Ithaca, NY, Lexington, KY, and Rosemount, MN on a percent basis.

	2016		2017			2018	
Cultivar	**NY**	**KY**	**NY**	**KY**	**MN**	**NY**	**KY**
	Neutral detergent fiber						
Hx14376	28.3b	37.4a	34.1b	31.9b	38.5b	35.7b	34.4b
WL355RR	29.7a	36.5a	35.2a	34.4a	41.2a	36.6a	36.2a
	Acid detergent fiber						
Hx14376	21.8b	27.5a	27.3b	24.9b	29.9b	29.8b	26.5b
WL355RR	23.6a	27.8a	28.8a	27.5a	33.1a	30.9a	28.3a
	Acid detergent lignin						
Hx14376	41.7b	61.4b	53.0b	53.5b	58.5b	48.4b	53.0b
WL355RR	47.8a	66.9a	62.3a	62.6a	75.0a	58.9a	60.7a
	Neutral detergent fiber digestibility						
Hx14376	56.5a	48.2a	49.7a	45.7a	45.0a	53.3a	44.1a
WL355RR	53.4b	44.9b	47.1b	43.9b	41.7b	48.3b	41.9b

Within each column/section, means without a common letter differ based on a Tukey's HSD test ($P < 0.05$).

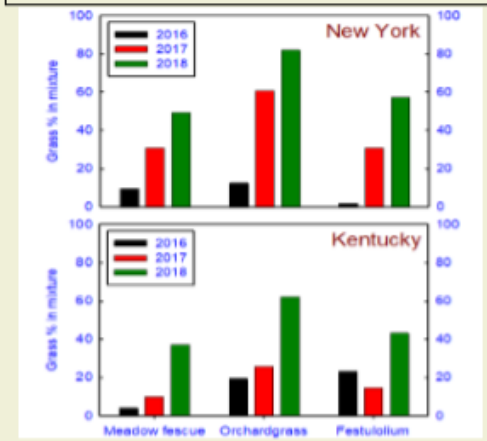

Figure 2. Grass proportion in alfalfa/grass mixtures over three years in NY and KY.

Results and Discussion:
Reduced-lignin alfalfa averaged 14.1% less acid detergent lignin and 5.9% greater neutral detergent fiber digestibility, compared with the standard variety (Table 1). Seasonal forage yield was slightly higher for the standard alfalfa vs. the reduced-lignin cultivar. Mixed alfalfa-grass stands had similar yields to pure alfalfa. Flower stage harvest resulted in increased yields vs. the bud stage harvest in a four cut system, but had reduced yields when four cuts were taken at the flower stage vs. five cuts in the bud stage. While the response of alfalfa across regions was relatively consistent, the three grass species were inconsistent across regions for grass percentage, yield and quality (Figure 2).

Conclusion
In conclusion, reduced-lignin alfalfa can provide higher quality alone or in grass mixtures, but evaluations need to be conducted on a regional basis. As expected, the grass proportion and the species also affect quality.

seeblue.

USING THE KENTUCKY FORAGE COUNCIL BOARD TO SET UNIVERSITY OF KENTUCKY EXTENSION PROGRAMMING AND AGENT TRAINING PRIORITIES

Jimmy C. Henning, Ray Smith, Chris Teutsch and Traci Missun[1]

Introduction:
The Kentucky Forage and Grassland Council (KFGC) has been an important organization in Kentucky since 1964. KFGC has been successful as an affiliated and support organization for Extension forage educational programs. KFGC has been a part of mentoring several national forage spokesperson winners and has been recognized as an outstanding forage council by the American Forage and Grassland Council.

Even with this history, it has been difficult to identify the true value of the council to Kentucky separate from public-supported Extension educational programs. Future relevance and success of state forage councils is dependent on their having a defined and tangible value to its members, especially the producer sector. Priority identification is one possible area of future relevance for forage councils.

Materials and Methods:
At the encouragement of university administration in 2016, KFGC engaged in a process to develop forage extension education priorities by utilizing their broad and diverse membership base. The forage council surveyed members online via Qualtrics®. An ad hoc committee of KFGC leadership consolidated the full survey results into five major themes which were ranked by the full KFGC board. UK specialists led the board through a 'sticky note' exercise to identify specific programming needed on each priority topic. Specific programming ideas were generated for the five programming priorities.

[1]Extension Professor, University of Kentucky, Lexington, KY (jimmy.henning@uky.edu); Extension Professor, University of Kentucky, Lexington, KY (raysmith1@uky.edu); Extension Associate Professor, University of Kentucky Research and Education Center, Princeton, KY (chris.teutsch@uky.edu); University of Kentucky County Extension Agent for Agriculture and Natural Resources, Oldham County, KY (traci.missun@uky.edu).

The following are forage needs identified in our February 29 KFGC Committee conference call. Please rank each of these as Very Important, Somewhat Important or Least Important.

	VERY Important	SOMEWHAT Important	LEAST Important
Grazing Schools	○	○	○
Advanced Grazing Schools	○	○	○
Grazing Conference	○	○	○
Horse Grazing Conference	○	○	○
Alfalfa/Stored Forage Conference	○	○	○
General Forages Conference (instead of Alfalfa/Stored Forage Conference) to address	○	○	○

KFGC members completed an online qualtrics ® survey for initial feedback on priorities.

A 'sticky note exercise was used to provide more specific input on each priority.

Results and Discussion:
The forage council successfully developed their top five forage priorities, specific programming ideas as well as areas for agent training. The top five areas of forage programming as ranked by the KFGC board of directors were: 1) Alternative forages and grazing cover crops, 2) Economics of forage production practices, 3) Silage, haylage and baleage and pricing for stored feed, 4) Weed identification and herbicide information, and 5) Using novel endophyte tall fescue. UK specialists report on progress towards these objectives at each board meeting.

Conclusion
Forage councils can make significant contributions to the agricultural community by facilitating the development of forage leadership and educational programming. Forage councils are uniquely structured to carry out this function – arguably one of its most important.

seeblue.

UPCOMING EVENTS

General Information

Conference Site

The Ferdinand Community Center in Ferdinand, IN is the host site for the 2019 conference. It is conveniently located just a few miles north of I-64 at Exit 63 in southern Indiana. The address for the community center is:

1710 Community Dr.
Ferdinand, IN 47532
www.ferdinandcommunitycenter.com

Lodging

A block of rooms have been reserved at the Comfort Inn at a conference rate of $99.00 + tax until **December 21, 2018. The Block is for one night only**. Contact the Comfort Inn at (623) 209-7605 and indicate that you are with the Heart of America Grazing Conference.

Comfort Inn
123 Scenic Hills Ct
Ferdinand, IN 47532

See the Indiana Forage Council Website for additional information: www.indianaforage.org

If interested in participating at this event as a vendor please contact Jason Tower at 812-678-4427 or towerj@purdue.edu

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Grazing 102
To be held June 21 - 22, 2019 at Southern Indiana Purdue Ag Center

Heart of America

Grazing Conference

January 22-23, 2019

Ferdinand Community Center
Ferdinand, Indiana

Heart of America Grazing Conference

January 22, 2019

(All Times are Eastern Standard Time)

12:00 PM **Registration, Trade Show, Silent Auction**

Managed Grazing Refresher Seminar

1:25 PM **Welcome**

1:30 **Overview of Grazing Terminology**
Jason Tower

2:00 **Understanding Forage Plant Growth and Rest Requirements**
Dr. Keith Johnson

2:30 **Grazing Enterprises—Challenges and Opportunities**
Jason Tower

3:00 Break

3:30 **Matching Forage Resources to Livestock Stage of Production**
Dr. Nick Minton

4:00 **Water Needs, Layout and Resources**
Robert Zupancic

6:00 –7:00 PM **Dinner**

After Dinner Program
Welcome Back Home Again in Indiana
Dr. Keith Johnson

Meet the Speakers—A Self Introduction

January 23, 2019

7:00 AM **Registration and Refreshments / Visit Trade Show and Silent Auction**

8:10 **Welcome**
Jason Tower

8:15 **Starting a Grass-Fed Beef Operation**
Dr. Scott Barao

9:15 **Changing My Pasture Composition Through Grazing Management**
Dr. R.P. Cooke, Dr. Dennis Fennewald

10:15 **Break—Visit Trade Show and Silent Auction**

10:45 **Grazing Technologies and Gadgets**
Dr. Scott Flynn

11:30 **Lunch—Visit Trade Show**

12:30 PM **Selecting Forage-Based Beef Genetics for a Profitable Operation and High Quality Carcass**
Dr. Scott Barao

1:30 **Forage Related Animal Disorders**
Dr. Grant Burcham

2:15 **Break, Trade Show, Silent Auction ends**

2:45 **Red Clover, More than Just Nitrogen**
Dr. Ray Smith

3:45 **How Proper Pasture Management and Strategic Supplementation Affect Animal Health and Performance**
Dr. R.P. Cooke, Dr. Dennis Fennewald

4:45 **Adjourn**

Conference Speakers

Dr. Scott Barao, PhD—Executive Director, Hedgeapple Farm

Dr. Grant Burcham, DVM, PhD—Director, Heeke Animal Disease Laboratory, Purdue University

Dr. R.P. "Doc" Cooke, DVM — Owner 499 ranch, writer for *Beef Producer Magazine* and semi-retired veterinarian

Dr. Dennis Fennewald, PhD—Associate Professor, Tennessee Tech with a focus on animal genetics and their interactions with the environment

Dr. Scott Flynn, PhD— Pasture and Land Management, Corteva Agrisciences

Dr. Keith Johnson, PhD— Forage Extension Specialist, Purdue University

Dr. Nick Minton, PhD — Beef Systems Specialist, Purdue University and Director Indiana Beef Evaluation Program

Dr. Ray Smith, PhD—Forage Specialist, University of Kentucky

Mr. Jason Tower — Superintendent, Southern Indiana Purdue Ag Center (SIPAC)

Mr. Robert Zupancic — Grazing Specialist, Indiana Natural Resources Conservation Service

Online registration available though the American Forage and Grassland Council

Please visit:
www.afgc.org

Note: when registering second person from the same farm only one set of proceedings will be provided.

Conference Registration

Name (s)_____

_____

Address _____

_____

City _____

State/Zip _____

Phone _____

E-mail _____

Early Registration — by December 20

Full Registration $90 _____

2nd from same farm $70 _____

One Day Registration $60 _____

2nd from same farm $40 _____

Please indicate 1/22____ or 1/23_____

After December 20

Full Registration $115 _____

2nd from same farm $95 _____

One Day Registration $75 _____

2nd from same farm $55 _____

Please indicate 1/22____ or 1/23_____

Meals with registration after January 13 CANNOT be guaranteed.

Return this form with check payable to:
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Phone: (765) 494-4800
E-Mail: johnsonk@purdue.edu

38th Annual
Kentucky Alfalfa and Stored Forage Conference

Practical Considerations for the Production of High Quality Hay and Baleage

When: Thursday, February 21st, 2019
8:00 am - 3:00 pm (EST)

Where: Fayette County Extension Office
1140 Harry Sykes Way
Lexington, KY 40504

Registration: www.2019KYAlfalfa.eventbrite.com
Before February 15th: $25
After February 15th: $35
Add KFGC membership for $15 more!

For those without internet access, please send check made out to "KFGC".
KY Alfalfa Conference
N-222C Ag. Science North
University of Kentucky
Lexington, KY 40546-0091

Sponsorship Exhibit booths: $250 - includes one registration
www.2019KYAlfalfa.eventbrite.com

Highlights

- Educational Presentations
- Company Exhibits
- Silent Auction
- Awards

University of Kentucky
College of Agriculture, Food and Environment

Kentucky Alfalfa and Stored Forage Conference

Schedule of Events

8:00 (EST)	Registration and Exhibits
8:45	Welcome and Introductions Ray smith, University of Kentucky
9:00	**Economics of Hay Production** Greg Halich, University of Kentucky
9:40	**Hay Prices and Trends** David Knopf, Kentucky Agricultural Statistics Service
10:00	Break, visit sponsors and silent auction
10:30	**Update on Hay Making Equipment and Technology** Josh Jackson, University of Kentucky
11:00	**Barn Considerations for Cash Hay Operations** Morgan Hayes, University of Kentucky
11:30	**Evolution of Mechanization and Transport in My Hay Operation** Ron Tombaugh, Dart Hay Service, Ink., Streator, IL
12:15	Lunch
1:00	Alfalfa Awards and Silent Auction Results Ray Smith, University of Kentucky
1:15	**Farmer Panel: Baleage—How it Works on My Farm** Todd clark, Lexington, KY; Tom Wright, Shelbyville, KY; and Jody Watson, Jackson, TN; moderated by Chris D. Teutsch, University of Kentucky
2:30	**How Good is our Kentucky Haylage? A Summary of Farm Results** Jimmy Henning, University of Kentucky
3:00	Survey and Adjourn

This meeting is a joint effort of the
Kentucky Forage and Grassland Council and the University of Kentucky.

CCA credits have been requested

see blue.

University of Kentucky
College of Agriculture, Food and Environment

Novel Tall Fescue Renovation Workshop

Princeton, KY

Wednesday, March 20, 2019 — **8:30 am-5pm CDT**

Toxic tall fescue reduces livestock weight gains and lowers reproductive performance. This one day workshop will give you the tools and information needed to remove toxic tall fescue and replace it with novel tall fescue varieties. Speakers include local producers, company representatives and researchers from across the country.

Photo Credit: Dr. Jimmy Henning, University of Kentucky

Topics Include:

- Fescue Toxicosis: Symptoms and Causes
- Economics
- Establishment and First Year Management
- Seed Testing
- Long-Term Pasture Management
- Company Products
- Incentives
- Producer Panel

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Pennington Seed
University of Georgia
University of Kentucky
USDA NRCS
Virginia Tech

ALLIANCE for GRASSLAND RENEWAL

Register at www.2019UKYNovelTallFescue.eventbrite.com

Before March 8—$60/person | After March 8—$75/person

Includes lunch, refreshments & proceedings

Central Presbyterian Church, 206 W. Main St. Princeton, KY 42445

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University of Kentucky
College of Agriculture, Food and Environment

Novel Tall Fescue Renovation Workshop

Organized by the Alliance for Grassland Renewal

Photo: Noble Research Institute

Agenda (All times are CDT)

8:30 am	Registration
9:00	Welcome, Dr. Ray Smith
9:10	Tall Fescue Toxicosis: Symptoms and Causes *Dr. Craig Roberts - University of Missouri*
9:35	Profitable Animal Production *Dr. Jeff Lehmkuhler - University of Kentucky*
10:00	Break and Demo: Endophytes Under Microscope *Dr. Carolyn Young - Noble Research Institute*
10:20	Establishment & First Year Management *Dr. John Andrae - Clemson University*
11:00	Management: Novels and Toxic Paddocks *Dr. Ray Smith - University of Kentucky*
11:40	Producer Economics *Darrel Franson - Producer*
12:00	Seed Quality and Endophyte Testing *Nick Hill - Agrinostics & Chris Agee - Pennington Seed*
12:15	Lunch and Microscope Demo
1:00	Calibrating a Seed Drill *Dr. Chris Teutsch - University of Kentucky*
1:45	Tour Plots at UK Research and Education Center *Gene Olson & Dr. Ray Smith- University of Kentucky*
3:00	Break and Microscope Demo
3:15	Company Product Highlights: *Peter Ballerstedt - Barenbrug USA* *Jerome Magnuson - DLF* *Mark Thomas - Mountain View Seed* *Chris Agee - Pennington Seed*
4:00	Cost-Share Incentive Programs *Adam Jones - USDA NRCS*
4:15	Producer Panel: On-Farm Success with Novel Tall Fescue *Jesse Ramer and Kevin Laurent*
5:00	ADJOURN

ALLIANCE for GRASSLAND RENEWAL

seeblue.

CCA credits have been requested

2019 Kentucky Fencing Schools

Organized and Sponsored by the Kentucky Forage and Grassland Council, UK Cooperative Extension Service, and the Master Grazer Program

helping producers learn the newest fencing methods and sound fencing construction with classroom and hands-on learning

WHEN: April 9, 2019 in Lexington, KY
April 11, 2019 in Burkesville, KY
May 30, 2019 in Russellville, KY

WHERE: Pirri Equine Teaching Pavilion
UK Maine Chance Farm
2815 Newtown Pike
Lexington, KY 40511

Cumberland County Extension Office
90 Smith Grove Road
Burkesville, KY 42717

Logan County Extension Office
255 John Paul Road
Russellville, KY 42276

COST: $30/participant -- includes notebook, refreshments, and lunch

Program Registration – DEADLINE is 2 weeks prior to workshop
Online Registration with CREDIT CARD at https://forages.ca.uky.edu/

Location you are registering for:
_____ **Lexington, KY** _____ **Burkesville, KY** _____ **Russellville, KY**

LIMITED TO 30 PARTICIPANTS!

Registration by U.S. Mail: Rehanon Pampell
UK Research and Education Center
1205 Hopkinsville St.
Princeton, KY 42445

Name: _____

Street: _____

City: _____ State: _____ Zip code: _____

Email: _____

Cell Phone: _____

Number of participants _____ x $30 per participant = _____ Total Amount to Enclose

Make CHECKS payable to: KFGC

The KENTUCKY Forage and Grassland COUNCIL

College of Agriculture, Food and Environment
Grain and Forage Center of Excellence

KADF KENTUCKY AGRICULTURAL DEVELOPMENT FUND

Kentucky Master Grazer Educational Program

More information is available at http://forages.ca.uky.edu or Rehanon.Pampell@uky.edu

2019 Kentucky Fencing School Agenda

7:30 Registration and Refreshments

8:15 Welcome and Overview of the Day

8:30 Fencing Types and Costs - *Morgan Hayes, UK*

9:00 Fence Construction Basics - *Clay Brewer, Stay-Tuff*
- Perimeter fences vs. cross fences
- Fencing options on rented farms
- Proper brace construction
- Line posts and fence construction

9:45 Break – visit with sponsors and presenters

10:15 Overview of Kentucky Fence Law - *Clint Quarles, KDA*

11:00 Electric Fencing Basics - *Jeremy McGill, Gallagher*
- Proper energizer selection and grounding
- Proper high tensile fence construction and wire insulation
- Electric offset wires for non-electric fences
- Underground wires and jumper wires

11:45 Innovations in Fencing Technologies - *Josh Jackson, UK*
- wireless fences, fence monitoring

12:15 Catered Lunch - visit with sponsors

1:00 Hands-on Fence Building - *Clay Brewer, Stay-Tuff; Jeremy McGill, Gallagher; and Jody Watson, ACI*
- Safety, fence layout, and post driving demo, *Jody Watson, ACI*
- H-brace construction, *Jeremy McGill, Gallagher and Clay Brewer, Stay-Tuff*
- Knot tying, splices, and insulator installation, *Jeremy McGill and Clay Brewer, Stay-Tuff*
- Installation of Stay-Tuff Fixed Knot Fence, *Clay Brewer, Stay-Tuff*
- Installation of High Tensile Fencing, *Jeremy McGill, Gallagher*

4:30 Questions, Survey and Wrap-up

Spring 2019 Kentucky Grazing School

helping producers learn the newest grazing methods with classroom and hands-on learning

WHEN: April 23-24, 2019

WHERE: Central Presbyterian Church
112 West Main Street
Princeton, KY 42445

LIMITED TO 45 PARTICIPANTS!!

COST: $50/participant -- includes all materials, grazing manual, breaks, and lunch both days

Program Registration – DEADLINE is April 5, 2019

Online Registration with CREDIT CARD at
https://forages.ca.uky.edu/

Registration by U.S. Mail:

Rehanon Pampell
UK Research and Education Center
1205 Hopkinsville Street
Princeton, KY 42445
Email: Rehanon.Pampell@uky.edu

Name: _____

Street: _____

City: _____

State: _____ Zip code: _____

Email: _____

Cell Phone: _____

Number of participants _____ x $50 per participant = _____ Total Amount

Make CHECKS payable to: KFGC

A list of nearby lodging can be found at http://wkrec.ca.uky.edu/directions

Sponsors:

The Kentucky Forage and Grassland Council

College of Agriculture, Food and Environment
Grain and Forage Center of Excellence

KADF Kentucky Agricultural Development Fund

Kentucky Master Grazer Educational Program

More information is available at http://forages.ca.uky.edu or Rehanon.Pampell@uky.edu

Spring 2019 Kentucky Grazing School

helping producers learn the newest grazing methods with classroom and hands-on learning

Emphasis on ruminants – beef, dairy, sheep, & goats

Tuesday April 23, 2019

7:30 Registration & Refreshments

8:00 Introduction of staff and participants

8:15 Benefits of Rotational Grazing – Dr. Ray Smith

8:35 Meeting Nutritional Needs on Pasture-Dr. Donna Amaral-Phillips

9:05 Grazing Math Concepts/ Introduce Field Exercise-Dr. Jeff Lehmkuhler

9:45 Break & Travel to Field Demonstration Area

10:10 Introduction to Temporary Fence- Jeremy McGill

10:30 Portable/Seasonal Water Systems- Dr. Jeff Lehmkuhler

10:50 Methods to Assess Pasture Production and Determine Stocking Rate- Dr. Ray Smith

11:30 Hands-on Building a Rotational Grazing System in the Field: Setting up Small Paddocks– Drs Ray Smith, Jeff Lehmkuhler, & Chris Teutsch

12:20 Lunch

1:00 Fence building: Understanding How to Build and Use Temporary Fencing and High Tensile Fencing – Jeremy McGill

2:30 Break and Travel to Teaching Facility

3:00 Growth of Grasses and Legumes with Response to Grazing- Dr. Ray Smith

3:45 Making Tall Fescue Work on Your Farm-Dr. Jimmy Henning

4:15 Economics of Grazing- Dr. Jeff Lehmkuhler

5:00 Discussion

5:30 Adjourn for the day

Supper on your own

Wednesday April 24, 2019

7:30 Refreshments

8:00 Forage Species for a Comprehensive Grazing System-Dr. Chris Teutsch

8:45 General Management Considerations for Grazing Livestock- Dr. Donna Amaral-Phillips

9:15 Using KY GRAZE to plan your Grazing Program - Adam Jones

10:00 Break

10:30 Fundamentals of Laying out a Grazing System - Kevin Laurent

11:00 Case Study: Design an on Farm Grazing System (Group Project)

11:45 Case Study Presentations

12:30 Lunch

1:15 How I made grazing work on the farm- Producer Speaker

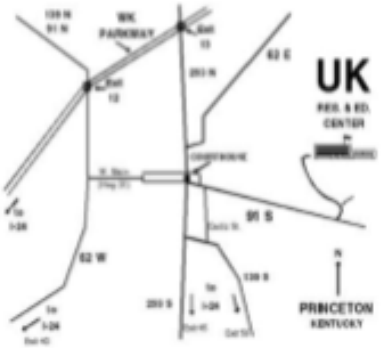
1:45 Rejuvenating Run down Pastures - Dr. Chris Teutsch

2:30 Evaluation- All Participants

2:45 Break & Travel to Field Demo Area

3:10 Field Exercise. Observe grazed paddocks and hear reports of each group. Tour demonstration plots showing warm and cool season annual to extend the grazing season, renovation options and the effects of rotational grazing.

5:00 Adjourn



*All times are Central Time

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UPCOMING EVENTS

January 22-23	**Heart of America Grazing Conference**	**Ferdinand, IN**
February 21	**KY Alfalfa and Stored Forage Conference**	**Lexington, KY**
March 20	**Novel Tall Fescue Renovation Workshop**	**Princeton, KY**
April 9	**Kentucky Spring Fencing School**	**Lexington, KY**
April 11	**Kentucky Spring Fencing School**	**Burkesville, KY**
April 23-24	**Kentucky Spring Grazing School**	**Princeton, KY**
May 30	**Kentucky Spring Fencing School**	**Russellville, KY**