UK Research Spotlight

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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

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Grain and Forage Center of Excellence

Kentucky Master Grazer Educational Program

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.

Distance between Disk Openers	Seeding Rate in lb/A																										
	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

SUMMARY

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

J.M. Buckman, jbuckman10@murraystate.edu

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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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).

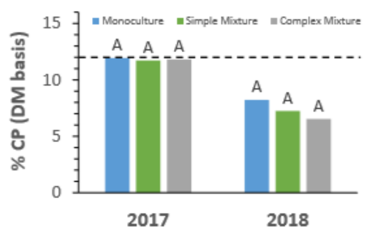


Figure 2. Crude protein response to mixtures. Treatments within a year with the same letter are statistically similar (α = 0.10). Line denotes the CP requirement for a growing steer to gain 1.5 lb/d.

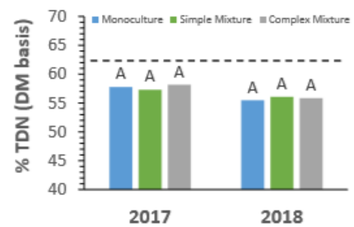
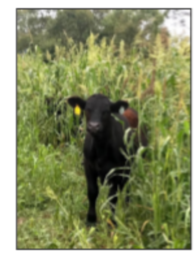


Figure 3. Total digestible nutrients response to mixtures. Treatments within a year with the same letter are statistically similar (α = 0.10). Line denotes the energy requirement for a growing steer to gain 1.5 lb/d.

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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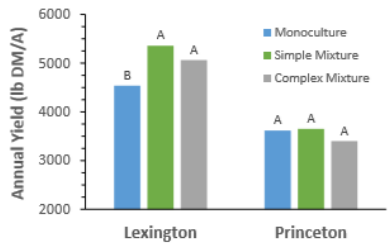

Figure 1. Impact of mixture on annual forage yield averaged across N rate. Treatments within a location with the same letter are statistically similar (α=0.05).

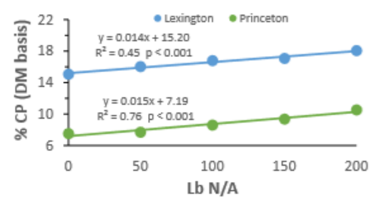

Figure 3. Impact of N rate averaged over mixtures on forage crude protein at two locations.

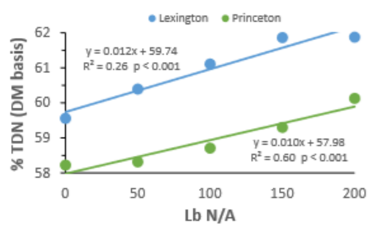

Figure 4. Impact of N rate averaged over mixtures on total digestible nutrients at two locations.

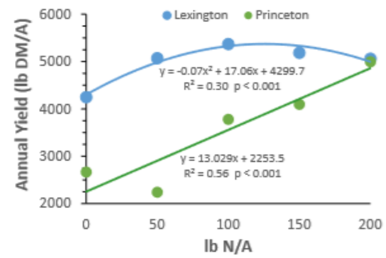

Figure 2. Impact of N rate on annual forage yields averaged across mixtures at two locations.

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)

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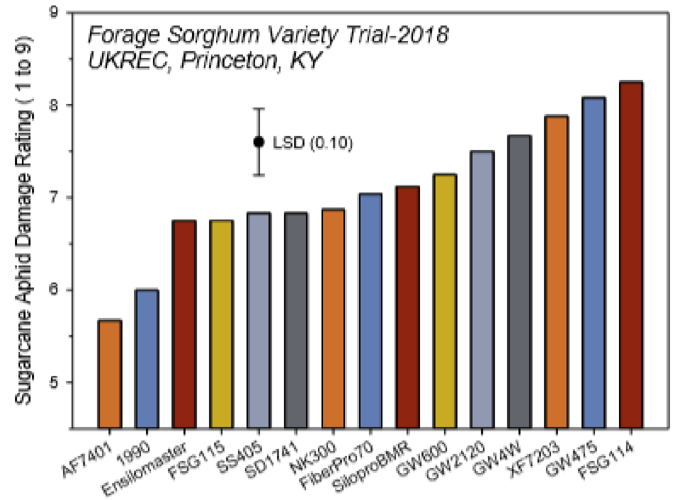

Figure 1. Sugarcane aphid damage rating averaged over aphicide applications for 15 forage sorghum varieties grown in Princeton, KY in 2018. The upper one-third of the canopy was rated on a scale of 1 to 9, with 1 being no damage and 9 being severe damage.

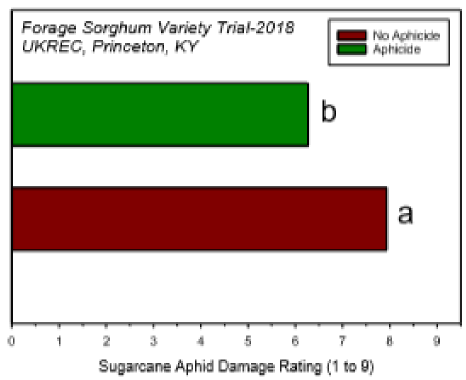

Figure 2. Sugarcane aphid damage rating as impacted by aphicide application at Princeton, KY in 2018. The upper one-third of the canopy was rated on a scale of 1 to 9, with 1 being no damage and 9 being severe damage.

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. Sugar-cane 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.

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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.

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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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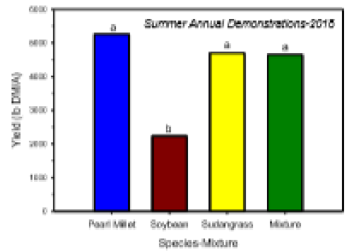
RESULTS



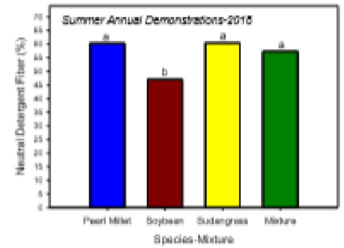
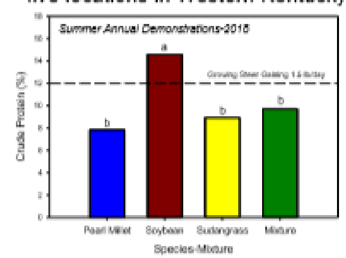


Figure 1 and 2. Yield and neutral detergent fiber of pearl millet, soybean, BMR sudangrass, and a mixture of the three, averaged over five locations in Western Kentucky.



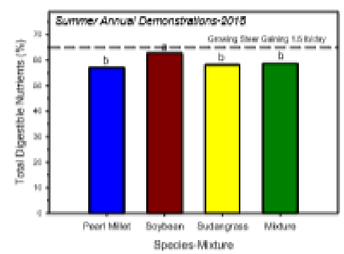
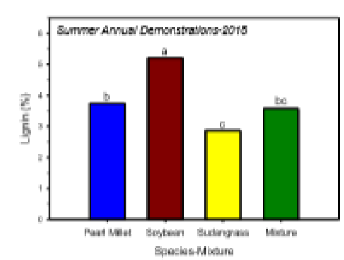


Figure 3 and 4. Crude protein (CP) and total digestible nutrients (TDN) of pearl millet, soybean, BMR sudangrass, and a mixture of the three, averaged over five locations in Western Kentucky.



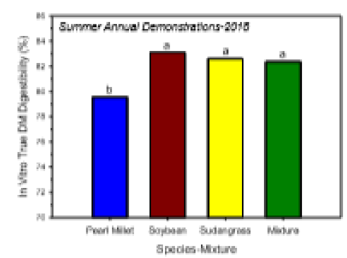


Figure 5 and 6. Lignin and 48-hr in vitro true dry matter digestibility (IVTDMD48) of pearl millet, soybean, BMR sudangrass, and a mixture of the three, averaged over five locations in Western Kentucky.

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?

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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).

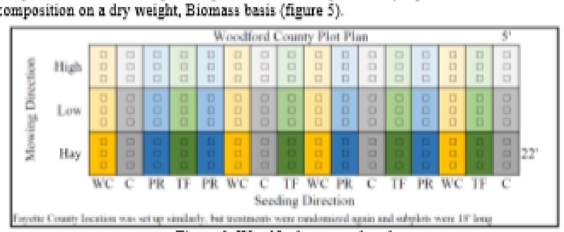


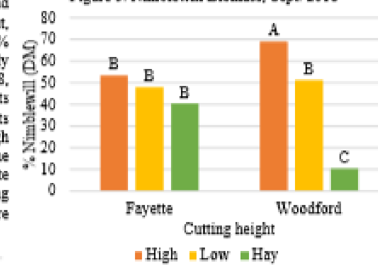
Figure 1. Woodford county plot plan.

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 3. Nimblewill Biomass, Sept. 2018



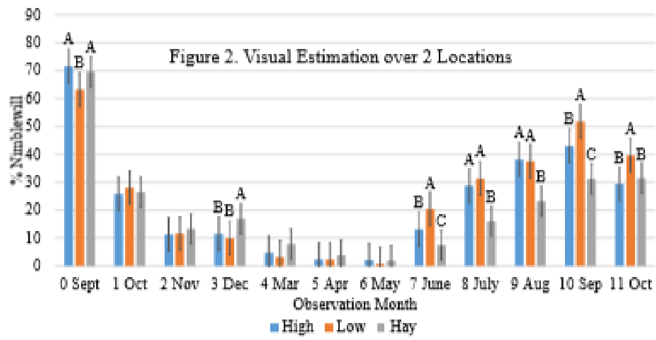


Figure 5. Students harvesting Nimblewill Biomass samples in Fayette county, August 2018.

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.

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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 ($P < 0.05$).

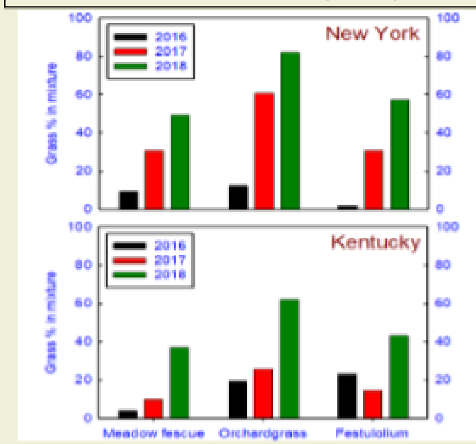

Figure 2. Grass proportion in alfalfa/grass mixtures over three years in NY and KY.

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.

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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.

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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.

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