28th Annual

February 28, 2012
University Plaza Hotel
Springfield, Missouri

Welcome to the 28th Annual Southwest Missouri Spring Forage Conference

Our 28th Annual Southwest Missouri Spring Forage Conference is accentuated by holding it on February 28, 2012. The SW Missouri Spring Forage Conference specifically targets forage producers. It is considered one of the most esteemed educational programs offered in Missouri, and has gained recognition in other states and regions as well. From its inception in the early 1980s, this conference has grown from about 50 attendees to more recent attendance numbers averaging around 400.

Our 2012 keynote speaker is the world-renowned expert in animal handling, Dr. Temple Grandin, Professor of Animal Science at Colorado State University. Dr. Grandin's life story is unique and remarkable. She has been featured on major media television programs and written up in Time magazine, People magazine, Discover magazine, Forbes and The New York Times. She is the focus of a semi-biographical HBO film, titled Temple Grandin. The title of her topic during our conference lunch break will be, "UNDERSTANDING ANIMAL BEHAVIOR". She will also be available for a follow up question and answer session.

In addition to the keynote address, we have organized four break-out sessions for you to attend covering a wide selection of topics. These topics present varied information on ways to improve and maintain your forage base, plus offer ideas for better livestock management and greater profitability. The goal of the SFC committee is to present a broad range of topics related to grazing agriculture. This does not constitute an endorsement of all the views and opinions for the speakers or vendors. We hope you will find those you are able to attend, educational and that you are able to take information back to benefit your own forage operations.

Between each break-out session and before and after lunch, please make sure you take time to visit the Trade Show. We have 30 to 40 vendors available for you to view and discuss their services and/or products.
Each year, the Planning Committee strives to improve upon our previous conferences. This year is no exception. We sincerely appreciate your comments and ask that you take a few minutes to complete the conference evaluation before leaving today.

A conference of this size requires the help of many individuals and organizations. The Spring Forage Conference planning committee is a partnership of the USDA Natural Resources Conservation Service, Soil and Water Conservation Districts of Southwest Missouri, University of Missouri Extension, USDA Farm Service Agency, Missouri State University Agriculture Department and the Missouri Department of Conservation.

Our many thanks go to the vendors, break sponsors, conference speakers and especially the producers for making this a quality conference. Thanks also to the Conference Planning Committee for their dedication and hard work involved in planning and conducting this year's conference and doing so as an additional function beyond their everyday job.

If you have any questions or comments during the conference, all committee members will be wearing tan shirts displaying the Spring Forage Conference logo. We will be more than willing to help you.
We hope you have an enjoyable day and are able to build on the information and ideas presented to enhance your own businesses!

Sincerely,

Jamie Kurtz
2012 Chair, SW Missouri Spring Forage Conference

28th Annual Southwest Missouri Spring Forage Conference

Tuesday, February 28, 2012
8:00 - 8:45 am
REGISTRATION & VISIT TRADE SHOW

8:45 - 9:30 -- CONCURRENT SESSIONS A
(Select one of these four sessions to attend)

((A1) Stocker Cattle Performance & Pasture Costs
(REPEATED at 2:45 pm)
Don Ball, Professor Emeritus
Auburn University, Alabama

(A2) Trichomoniasis in Cattle
(REPEATED at 2:45 pm)
Craig Payne DVM, Director of Veterinary Extension,
University of Missouri, Columbia, MO

(A3) Managing the Spring Flush of Forage Growth in a Grazing System
Mark Kennedy, State Grassland Specialist
NRCS, Houston, MO

(A4) Profiting from Woodlands - Diversification on the Farm
Robert DeMoss, Forester
NRCS, Ava, MO

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

10:15 - 11:00 -- CONCURRENT SESSIONS B
(Select one of these four sessions to attend)

(B1) Can I Afford to Fertilize?
(REPEATED at 2:45 pm)
Dr. Will McClain, Agronomy Specialist
MU Extension, Steelville, MO

(B2) Role of Forages in the Changing Beef Industry
(REPEATED at 2:45 pm)
Dr. Scott Brown, Livestock Marketing Specialist
University of Missouri, Columbia, MO

(B3) Weed Management – Considerations for Pasture and Hayfields in Missouri
Dr. Kevin Bradley, Associate Professor Weed Science State Specialist
University of Missouri, Columbia, MO

(B4) Managing with Grazing Records
Darrel Franson, Producer, Lawrence County, MO
Bob Salmon, Producer, St. Clair County, MO

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

11:45 -- LUNCHEON

Emcee – Joann Pipkin, Owner, Show Me Agri-Comm
& Editor, Cattlemen's News - Joplin Regional Stockyards

Keynote Address
"Understanding Animal Behavior"
DR. TEMPLE GRANDIN
A world leader in livestock handling facilities design.
Professor of Animal Science, Colorado State University, Colorado

1:00 - 1:45 pm -- BREAK and Visit Trade Show

1:45 - 2:30 -- CONCURRENT SESSIONS C
(Select one of these four sessions to attend)

(C1) Question & Answer time with Keynote Speaker
Dr. Temple Grandin, Professor of Animal Science

(C2) Minimizing Hay Feeding & Storage Losses
Justin Sexten, Beef Cattle Feeding Specialist
University of Missouri, Columbia, MO

(C3) Carrying Capacity - A Balancing Act
Myron Hartzell, Grassland Specialist
NRCS, Buffalo, MO

(C4) Meeting Nutritional Needs of Livestock Using Forages
Dr. Rob Kallenbach, State Agronomy Specialist
University of Missouri, Columbia, MO

2:30 - 2:45 pm -- BREAK

2:45 - 3:30 – CONCURRENT SESSIONS D
(Select one of these four sessions to attend)

(D1) Stocker Cattle Performance & Pasture Costs
Don Ball, Professor Emeritus
Auburn University, Alabama

(D2) Can I Afford to Fertilize?
Dr. Will McClain, Agronomy Specialist
MU Extension, Steelville, MO

(D3) Trichomoniasis in Cattle
Craig Payne DVM, Director of Veterinary Extension,
University of Missouri, Columbia, MO

(D4) Role of Forages in the Changing Beef Industry
Dr. Scott Brown, Livestock Marketing Specialist
University of Missouri, Columbia, MO

3:30 pm ADJOURN

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Southwest Missouri Spring Forage Conference
February 28, 2012

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Committee Members

Pat Adams – NRCS
Area Resource Conservationist
1786 S. 16th Ave Suite 102
Ozark, MO 65721
417-581-2719 Ext. 108
pat.adams@mo.usda.gov

Roger Ankrom - Polk County SWCD
District Technician
1333 East Broadway
Bolivar, MO 65613
417-326-5993 Ext 3 or 111
roger.ankrom@swcd.mo.gov

Gereon Brownsberger - Dade County NRCS
Soil Conservation Technician
124 S. Hwy 39
Greenfield, MO 65661
417-637-5993 Ext 3
gereon.brownsberger@mo.usda.gov

Dr. Gordon Carriker - MU
University of Missouri Extension
Agriculture Business Specialist
105 N 2nd Street, PO Box 160
Ozark, MO 65721
417-581-3558
carrikerg@missouri.edu

Rex Choate – Lawrence County SWCD
District Technician
10763 Hwy 39-G
Mt. Vernon, MO 65712
417-466-7682, ext.3
rex.choate@swcd.mo.gov

Mark Emerson - Webster County NRCS
Resource Conservationist (Grassland)
1202 Banning St
Marshfield, MO 65706
417-468-4176 Ext 3
mark.emerson@mo.usda.gov

Dr. Ben Fuqua - Missouri State University
Professor
901 South National Ave.
Springfield, MO 65804
417-836-5092
BenFuqua@missouristate.edu

Alan Garton - Laclede County NRCS
Resource Conservationist
1242 Deadra Drive
Lebanon, MO 65536-1015
417-532-6305 Ext 3 or 1-800-203-4467
alan.garton@mo.usda.gov

Dee Glenn - Dade County SWCD
District Programs Coordinator
124 S. Hwy 39
Greenfield, MO 65661
417-637-5993 Ext 3
dee.glenn@swcd.mo.gov

Curtis Gooch – Polk County NRCS
Resource Conservationist
1333 East Broadway
Bolivar, MO 65613
417-326-5993 Ext 3
curtis.gooch@mo.usda.gov

Mark Green - Greene County NRCS
District Conservationist
688 S. State Hwy. B Suite 200
Springfield, MO 65802
417-831-5246 Ext 3
mark.green@mo.usda.gov

Myron Hartzell – Dallas County NRCS
Resource Conservationist
1225 South Ash
Buffalo, MO 65622
417-345-2312, Ext.3
myron.hartzell@mo.usda.gov

28th Annual
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Committee Members

Aaron Hoefer - Christian County NRCS
District Conservationist
1786 S. 16th Ave, Suite 102
Ozark, MO 65721
417-581-2719 Ext 3
aaron.hoefer@mo.usda.gov

Deneen Jenkins - Greene County SWCD
District Manager
688 S. State Hwy. B Suite 200
Springfield, MO 65802
417-831-5246 Ext 3
deneen.jenkins@swcd.mo.gov

Connie Krider
324 East Center Ave.
Seymour, Missouri 65746
417-741-1230
kridercon@gmail.com

Ian Kurtz
707 N. 6th Ave.
Ozark, MO 65721
417-581-6002
kurtzclan@cebridge.net

Jamie Kurtz – Douglas County NRCS
Resource Conservationist
3210 Hoover Dr.
West Plains, MO 65775
417-256-7117 Ext 3
jamie.kurtz@mo.usda.gov

Brie Menjoulet
University of Missouri Extension
Agronomy Specialist
Hickory County Extension Center
P.O. Box 187
Hermitage, MO 65668
menjouletb@missouri.edu

Tricia Radford - MDC
Wildlife Services Biologist
688 S. State Hwy B, Suite 100
Springfield, MO 65802
417-831-5246 Ext 6
Tricia.Radford@mdc.mo.gov

Tony Rosen – Dallas County SWCD
District Technician
1225 South Ash
Buffalo, MO 65622
417-345-2312 Ext 3 or Ext 111
tony.rosen@swcd.mo.gov

Tim Schnakenberg
University of Missouri Extension
Agronomy Specialist
P.O Box 345
Galena, MO 65656
417-357-6812
SchnakenbergC@missouri.edu

Wesley Tucker
University of Missouri Extension
Agriculture Business Specialist
451 S. Albany
Bolivar, MO 65613
417-326-4916
tuckerw@missouri.edu

Nathan Witt – Newton County NRCS
Resource Conservationist
1900 S Hwy 71
Neosho, MO 64850
417-451-1366 Ext 3
nathan.witt@mo.usda.gov

Andy Humble - MDC
Privot Land Conservationist
1786 S. 16th Ave, Suite 102
Ozark, MO 65721
417-581-2719
andy.humble@mdc.mo.gov

Chris Hoeme - St. Clair NRCS
Soil Conservationist
3835 NE Hwy 13
Osceola, MO 64776
417-646-8108 Ext 3
chris.hoeme@mo.usda.gov

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Webster County	417-468-4176
Wright County	417-741-6195

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Key Note Speaker Biography

Dr. Temple Grandin's achievements are remarkable because she was an autistic child. Mentoring by her high school science teacher and her aunt on her ranch in Arizona motivated Temple to study and pursue a career as a scientist and livestock equipment designer.

Dr. Temple Grandin obtained her B.A. at Franklin Pierce College in 1970. In 1974 she was employed as Livestock Editor for the Arizona Farmer Ranchman and also worked for Corral Industries on equipment design. In 1975 she earned her M.S. in Animal Science at Arizona State University for her work on the behavior of cattle in different squeeze chutes. Dr. Grandin was awarded her PhD in Animal Science from the University of Illinois in 1989 and is currently a Professor at Colorado State University.

She has done extensive work on the design of handling facilities. Half the cattle in the U.S. and Canada are handled in equipment she has designed for meat plants. Other professional activities include developing animal welfare guidelines for the meat industry and consulting with McDonalds, Wendy's International, Burger King, and other companies on animal welfare.

Following her Ph.D. research on the effect of environmental enrichment on the behavior of pigs, she has published several hundred industry publications, book chapters and technical papers on animal handling plus 45 refereed journal articles in addition to seven books. She currently is a professor of animal sciences at Colorado State University where she continues her research while teaching courses on livestock handling and facility design. Her book, Animals in Translation was a New York Times best seller and her book Livestock Handling an Transport, now has a third edition which was published in 2007. Other popular books authored by Dr. Grandin are Thinking in Pictures, Emergence Labeled Autistic, Animals Make us Human, Improving Animal Welfare: A Practical Approach, and The Way I See It.

Dr. Grandin has had a major impact on the meat and livestock industries worldwide. She has received numerous awards including the Meritorious Achievement Award from the Livestock Conservation Institute, named a Distinguished Alumni at Franklin Pierce College, and received an honorary doctorate from McGill University, University of Illinois, and Duke University. She has also won prestigious industry awards including the Richard L. Knowlton Award from Meat Marketing and Technology Magazine and the Industry Advancement Award from the American Meat Institute and the Beef Top 40 industry leaders and the Lifetime Achievement Award from The National Cattlemen's Beef Association. Humane groups have also recognized her work and she received several awards. HBO has recently premiered a movie about Temple's early life and career with the livestock industry. The movie received seven Emmy awards, a Golden Globe, and a Peabody Award. In 2011, Temple was inducted into the Cowgirl Hall of Fame.

Dr. Grandin is a past member of the board of directors of the Autism Society of America. She lectures to parents and teachers throughout the U.S. on her experiences with autism. Articles and interviews have appeared in the New York Times, People, Time, National Public Radio, 20/20, The View, and the BBC. She was also honored in Time Magazines 2010 "The 100 Most Influential People in the World." Dr. Grandin now resides in Fort Collins, Colorado.

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Speaker Biographies

Dr. Don Ball was born in Owensboro, Kentucky and grew up on a crop and livestock farm in Daviess County, Kentucky. He received a B.S. in biology and agriculture from Western Kentucky University in 1968, spent 3 years in the U.S. Army, and subsequently entered Auburn University, from which he received the M.S. in 1973 and the Ph.D. in 1976, both in Agronomy.

Dr. Ball was hired as Extension Forage Crop Agronomist at Auburn University in 1976. He had statewide responsibility for extension educational programs with forage crops in Alabama from April, 1976 until January, 2011. He was awarded the rank of Professor in 1988, was named Alumni Professor in 1997 (the first Extension Specialist at Auburn University to receive this recognition), and is now Professor Emeritus.

He has been involved in programs involving many different forage crops and livestock production systems and has worked closely with faculty members in numerous academic disciplines, both at Auburn University and elsewhere. In his work he has placed particular emphasis on minimizing the impact of the tall fescue endophyte, use of legumes in livestock production, reducing hay storage and feeding losses, and reducing stored feed needs.

Dr. Ball has been an active disseminator of information on forage crop topics. He is the author of more than 30 Auburn University bulletins and circulars, over 700 magazine or trade journal articles, over 250 Auburn University "Timely Information" sheets, and dozens of other popular and technical articles of various types. He has developed numerous slide/tape sets and educational videos, he is an author of the book Southern Forages (which has been used as a textbook at more than 60 colleges and universities), and is sole author of the book Practical Forage Concepts.

He has been active in numerous professional and commodity organizations including the American Society of Agronomy, the Crop Science Society of America, and the American Forage and Grassland Council (AFGC). He is a former president of AFGC and was Chairman of the Southern Pasture and Forage Crop Improvement Conference. He served on the Alfalfa Council Advisory Board and is Technical Advisor to four Oregon Seed Commissions (Clover, Orchardgrass, Ryegrass, and Tall Fescue).

Honors have included the USDA Superior Service Award, AFGC Medallion Award, Auburn University Extension Excellence Award, and the Alabama Extension Specialist Association Professional Recognition Award. He is a Fellow of both the American Society of Agronomy and the Crop Science Society of America. In addition, he was Western Kentucky University Agricultural Alumnus of the year in 1990 and was inducted into the WKU Hall of Distinguished Alumni in 2001. Dr. Ball has been an invited speaker on over 2,000 programs, ranging from county meetings to international conferences, and has traveled extensively within the U.S. as well as internationally.

Robert Kallenbach is a Professor at the University of Missouri in the Division of Plant Sciences. He received a B.S. in Agronomy from Southwest Missouri State University, the M.S. in Agronomy from the University of Missouri and the Ph.D. in Agronomy from Texas Tech University. Rob has an extension/research appointment in forages. His program emphasizes forage-livestock systems with an emphasis on winter feeding. Specific projects include optimizing the use of stockpiled tall fescue, understanding residual feed intake in beef cattle, and performance of stocker cattle in season-long systems.

Mark Kennedy was raised on a family beef, dairy, and catfish farm in central Arkansas and received a BS degree in animal science and forages from Arkansas State University in 1977. He has been employed by USDA – SCS/NRCS since 1978, serving at various locations in Arkansas and Missouri. Since 1995 he has been the State Grazingland Specialist for USDA-NRCS in Missouri, headquartered in Houston, Missouri. Mark serves as an instructor at 18 to 20 grazing schools throughout Missouri each year. He speaks at 20 to 30 forage conferences, field days and workshops each year throughout Missouri. He is a Certified Forage & Grassland Professional through the American Forage and Grassland Council. In 2004 he received the Missouri Forage and Grassland Council's Grasslander of the year award. In 2006 he was awarded the NRCS National Pastureland Conservationist of the Year award. He received the Merit Award from AFGC in 2011. He currently serves on the board of directors of the Missouri Forage and Grassland Council/Grazinglands Conservation Initiative, and the American Forage and Grassland Foundation board. He is a past board member of the American Forage and Grassland Council and the Society for Range Management Southern Section. Mark and his wife Anita live on a small farm near Houston, Missouri where they raise meat goats.

Dr. Kevin Bradley is an Associate Professor and State Extension Weed Scientist in the Division of Plant Sciences at the University of Missouri. Kevin is a native of Virginia and received a B. S. degree in Agriculture from Ferrum College and a Ph.D. in Weed Science from Virginia Tech. Dr. Bradley's faculty appointment includes extension and research responsibilities in the area of weed management in corn, soybean, wheat, pastures, and forages. Dr. Bradley also teaches a graduate level class in herbicide mechanism of action. In addition to evaluating new herbicides and weed management techniques, Dr. Bradley's applied research program focuses on the development of programs for the prevention and management of herbicide-resistant weeds, on the interaction of herbicides and weeds with other agrochemicals and pests in the agroecosystem, and on the effects of common pasture weeds on forage yield, quality, and grazing preference and distribution.

Justin Sexten received a B.S. in Agriculture (Animal Science), from the University of Kentucky. He received both a M. S. and Ph. D. in Animal Science, Ruminant Nutrition, from the University of Illinois at Urbana-Champaign.

Justin Sexten joined the faculty of the Division of Animal Sciences at the University of Missouri in July 2007. He is responsible for programming in the area of beef cattle nutrition and forage management. Justin grew up on his family's cow-calf and row crop farm in southwestern Ohio. Sexten's extension programs benefit from his experience in cow-calf, stocker, and feedlot segments of the beef industry and a strong production agriculture background.

Extension responsibilities include providing leadership in development of nutritional and forage management resources for regional livestock specialists, veterinarians and producers. Justin oversees the University or Missouri campus feedlot and commercial cowherd in addition to a small stocker cattle operation managed by his wife Julie and three daughters Macie, Morgan and Millie.

Craig Payne received his DVM degree from the University of Missouri-College of Veterinary Medicine in 1993. Upon graduation he practiced at the Animal Medical Center in Marshfield, MO for one year before moving to Sedalia, MO where he became a partner at the Sedalia Veterinary Center. He practiced in Sedalia until 2005 at which time he and his wife moved to Kingsville, TX where he pursued an MS degree in Agribusiness from the King Ranch Institute for Ranch Management at Texas A&M – Kingsville. After completing his MS degree in 2007, Craig accepted a position as an extension veterinarian for the University of Missouri and is currently the Director of the Department of Veterinary Extension and Continuing Education at the MU-College of Veterinary Medicine.

Myron Hartzell began his career with the USDA Natural Resources Conservation Service (formerly Soil Conservation Service) in 1979. Since 1984, he has worked with grassland producers in the south central Missouri Ozarks, planning and adapting various grazing practices to best fit the resources of the individual farms and producer goals. His current position, since 2003, is Resource Conservationist at the Dallas County Service Center in Buffalo, MO.

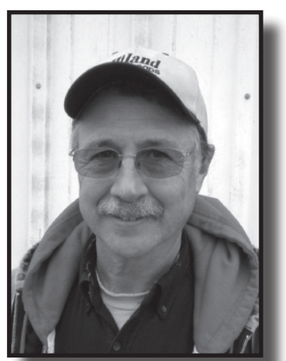
Myron was raised on a cow/calf and feeder pig farm near Branson where his parents were full time farmers raising seven children. Early lessons were learned in the values of 'doing the best with what you have, making everything count, and planning for the future but living for today'. A broad study of soils, plants and animals was used to obtain his BS degree in Wildlife Conservation and Management from Southwest Missouri Sate University.

Scott Brown is a research assistant professor in the Department of Agricultural and Applied Economics at the University of Missouri. In this role, Scott has worked with U.S. Congress over the past two decades in determining the quantitative effects of changes in dairy and livestock policies and has testified regarding dairy and livestock policy issues before House and Senate Agriculture committees. He has also worked on the economic effects of industry led programs such as the Cooperatives Working Together (CWT) that currently operates in the dairy industry. Scott is investigating the economic effects of the adoption of new technologies in the cattle industry that can increase high-quality cattle supplies. Scott received his PhD degree in agricultural economics from the University of Missouri and his BS degree in agricultural business from Northwest Missouri State University. Scott grew up on a diversified farm in Northwest Missouri.

Darrel Franson is a life-long student of the science of agriculture. Franson recognized one thing early on in his, albeit late-started career in production agriculture just two decades ago. That one thing was the need for records. With so many variables affecting the outcome of everything that is done on a farm, the only way to know what works (and what doesn't work) is to note the variables (weather, soil, markets, etc.) and record one's practices and the results of those practices as accurately as possible. One of those record-keeping practices has been daily grazing records in his management intensive grazing operation. Franson recognizes much of what we all do in production agriculture is rolling the dice on a 'hip-shot'. He believes records can help us 'level the barrel' and 'hit the target' with greater consistency.

William Edward McClain II (Will) was born 1970 in Little Rock, Arkansas and grew up in the town of Mt. Vernon, Missouri on a small cow-calf farm. He attended Mt. Vernon schools from 3rd grade through graduating in 1988. In 1989, he joined the Army early to help pay for a college education and stayed in the National Guard until 1999. He attended Southwest Missouri State University and received a B.S. in Horticulture/ Agronomy before working at a private country club as the head horticulturist and heavy equipment operator for several years. He then returned to Southwest Missouri State University and obtained a M.S. in Plant Sciences followed by a couple of years teaching soil and plant science courses in the Agriculture Department. After being convinced by Dr. Anson Elliot to pursue a PhD, he started at the University of Missouri under the advisement of Dr. Dale Blevins. His research projects covered many aspects of tall fescue production including stockpiling, seed production and nutrient dynamics. After completing his PhD, he worked as a senior research specialist for Dr. Robert Sharp on a drought project looking at changes in root architecture and depth of several soybean cultivars. Will is married to Julie and has three children Madison 12, Gwenyth 8 and Cole 5. When not at work, spending time with his family or asleep on the couch, you can usually find Will fishing any one of the great creeks or rivers in south central Missouri.

Robert DeMoss is a graduate of Stephen F. Austin State University in Nacogdoches, TX where he obtained a B.S. degree in Forest Management. Robert has worked in both the private and public sectors dealing with forest management. His experience includes reforestation, site preparation, timber harvesting, precommercial thinning, and prescribed burning. After graduating, he worked as a district forester for Louisiana-Pacific Corporation in southeast Texas for nine years. In 2002 he accepted a forester position with the Natural Resources Conservation Service serving as a team member of the South Missouri Water Quality office with providing forestry assistance to landowners in a 21 county area of the White River Watershed. Robert has recently been stationed in Ava, Missouri where he is serving private landowners in a multi-county area with forest management assistance through Farm Bill programs.



Bob and Susan Salmon, along with two grown sons own and operate Salmon Ranch in northern St Clair county. Out of necessity in 1987 Bob embarked on a journey to improve his grass management. The goal being consistent profitability with the main input being labor. " We have no money therefore we must THINK". After over 20 years of diligent observation and a willingness to change and adapt to various situations caused by weather, markets,etc he has developed a management style that is flexible, sustainable, and most importantly, always PROFITABLE.

This operation includes stockers, breeding heifer development, cow-calf, custom grazing and sheep. Bob also raises and trains Border Collies in his "spare time".

As well as the income to raise four children, this operation has afforded Bob the opportunity to be active in his community. He has served on the local school board, church council, State and county cattlemen's association boards, Partners in Pasture grazing group, and various other boards.

Thinking the Way Animals Do

Temple Grandin, Ph.D.
Department of Animal Science
Colorado State University

Temple Grandin is an assistant professor of animal science at Colorado State University. She is the author of the book Thinking in Pictures. Television appearances include 20/20, CBS This Morning, and 48 Hours. Dr. Grandin has autism, and her experiences have helped her to understand animal behavior. She teaches a course in livestock handling at the university and consults on the design of livestock handling facilities.
Unique insights from a person with a singular understanding.

As a person with autism, it is easy for me to understand how animals think because my thinking processes are like an animal's. Autism is a neurological disorder that some people are born with. Scientists who study autism believe that the disorder is caused by immature development of certain brain circuits, and over development of other brain circuits. Autism is a complex disorder that ranges in severity from a mild form (such as mine), to a very serious handicap where the child never learns to talk. The movie Rain Man depicts a man with a fairly severe form of the disorder.

I have no language-based thoughts at all. My thoughts are in pictures, like videotapes in my mind. When I recall something from my memory, I see only pictures. I used to think that everybody thought this way until I started talking to people on how they thought. I learned that there is a whole continuum of thinking styles, from totally visual thinkers like me, to the totally verbal thinkers. Artists, engineers, and good animal trainers are often highly visual thinkers, and accountants, bankers, and people who trade in the futures market tend to be highly verbal thinkers with few pictures in their minds.

Most people use a combination of both verbal and visual skills. Several years ago I devised a little test to find out what style of thinking people use: Access your memory on church steeples. Most people will see a picture in their mind of a generic "generalized" steeple. I only see specific steeples; there is no generalized one. Images of steeples flash through my mind like clicking quickly through a series of slides or pictures on a computer screen. On the other hand, highly verbal thinkers may "see" the words "church steeple," or will "see" just a simple stick-figure steeple.

A radio station person I talked to once said that she had no pictures at all in her mind. She thought in emotions and words. I have observed that highly verbal people in abstract professions, such as in trading stocks or in sales, often have difficulty understanding animals. Since they only think in words, it is difficult for them to imagine that an animal can think. I have found that really good animal trainers will see more detailed steeple pictures. It is clear to me that visual thinking skills are essential to horse training, but often the visual thinkers do not have the ability to verbalize and explain to other people what it is they "see."

Associative Thinking

A horse trainer once said to me, "Animals don't think, they just make associations." I responded to that by saying, "If making associations is not thinking, then I would have to conclude that I do not think." People with autism and animals both think by making visual associations. These associations are like snapshots of events and tend to be very specific. For example, a horse might fear bearded men when it sees one in the barn, but bearded men might be tolerated in the riding arena. In this situation the horse may only fear bearded men in the barn because he may have had a bad past experience in the barn with a bearded man.

Animals also tend to make place-specific associations. This means that if a horse has bad prior experiences in a barn with skylights, he may fear all barns with skylights but will be fine in barns with solid roofs. This is why it is so important that an animal's first association with something new is a good first experience.

Years ago a scientist named N. Miller found that if a rat was shocked the first time it entered a new passageway in a maze, it would never enter that passageway again. The same may be true for horses. For example, if a horse falls down in a trailer the first time he loads, he may fear all trailers. However, if he falls down in a two-horse, side-by-side trailer the 25th time he is loaded, he may make a more specific association. Instead of associating all trailers with a painful or frightening experience, he is more likely to fear side-by-side trailers, or fear a certain person associated with the "bad" trailer. He has learned from previous experience that trailers are safe, so he is unlikely to form a generalized trailer fear.

Fear Is the Main Emotion

Fear is the main emotion in autism and it is also the main emotion in prey animals such as horses and cattle. Things that scare horses and cattle also scare children with autism. Any little thing that looks out of place, such as a piece of paper blowing in the wind, may cause fear. Objects that make sudden movements are the most fear-provoking. In the wild, sudden movement is feared because predators make sudden movements.
Both animals and people with autism are also fearful of high-pitched noises. I still have problems with high-pitched noise. A back-up alarm on a garbage truck will cause my heart to race if it awakens me at night. The rumble of thunder has little effect. Prey species animals, such as cattle and horses, have sensitive ears, and loud noise may hurt their ears. When I was a child the sound of the school bell ringing was like a dentist drill in my ear. A loudspeaker system at a horse show may possibly have a similar effect on horses.

People with autism have emotions, but they are simpler and more like the emotions of a vigilant prey species animal. Fear is the main emotion in a prey species animal because it motivates the animal to flee from predators. The fear circuits in an animal's brain have been mapped by neuroscientists. When an animal forms a fear memory, it is located in the amygdala, which is in the lower, primitive part of the brain. J.E. LeDoux and M. Davis have discovered that fear memories cannot be erased from the brain. This is why it is so important to prevent the formation of fear memories associated with riding, trailering, etc.

For a horse who has previously been fearful of trailers to overcome his fear, the higher brain centers in the cortex have to send a fear suppression signal to the amygdala. This is called a cortical over-ride, which is a signal that will block the fear memory but does not delete it. If the animal becomes anxious, the old fear memory may pop back up because the cortex stops sending the fear suppression signal.

Fear-based behaviors are complex. Fear can cause a horse to flee or fight. For example, many times when a horse kicks or bites, it is due to fear instead of aggression. In a fear-provoking situation where a horse is prevented from flight, he learns to fight. Dog trainers have learned that punishing a fear-based behavior makes it worse. When a horse rears, kicks, or misbehaves during training, it may make the trainer feel angry. The trainer may mistakenly think that the horse is angry. But the horse is much more likely to be scared. Therefore it is important for trainers to be calm. An angry trainer would be scary to the horse. There are some situations where a horse may be truly aggressive towards people, but rearing, kicking, running off, etc., during handling or riding is much more likely to be fear based.

Effects of Genetics

In all animals both genetic factors and experience determine how an individual will behave in a fear-provoking situation. Fearfulness is a stable characteristic of personality and temperament in animals. Animals with high-strung, nervous temperaments are generally more fearful and form stronger fear memories than animals with calm, placid temperaments. For example, research on pigs conducted by Ted Friend and his

students at Texas A&M University showed that some pigs will habituate to a forced non-painful procedure and others will become more and more fearful.
Pigs were put in a tank where they had to swim for a short time. This task was initially frightening to all of the pigs and caused their adrenaline level to go up. Adrenaline is secreted in both people and animals when they are scared.

Over a series of swimming trials, some pigs habituated and were no longer scared, but others remained fearful throughout the trials. In the pigs that did not habituate adrenaline stayed elevated, which showed that the pigs were still afraid.

It is likely that horses would respond to different training methods in a similar manner. Horses with calm placid dispositions are more likely to habituate to rough methods of handling and training compared to flighty, excitable animals. The high-strung, spirited horse may be ruined by rough training methods because he becomes so fearful that he fails to learn, or habituate.

On the other hand, an animal with a calm, nonreactive nervous system will probably habituate to a series of nonpainful forced training procedures, whereas a flighty, high- strung nervous animal may never habituate. Horses who are constantly swishing their tails when there are no flies present and have their heads up are usually fearful horses. In the wild, horses put their heads up to look for danger.

Effects of Novelty

As a creature of flight, how a horse reacts to novel or unusual situations or new places can be used to access his true temperament. French scientist Robert Dantzer found that sudden novelty shoved into an animal's face can be very stressful. A horse with a high-strung, fearful nature may be calm and well-mannered when ridden at home. However, his true temperament has been masked because he feels relaxed and safe in a familiar environment. When he is suddenly confronted with the' new sights and sounds at a horse show he may blow up.
It is the more high-strung and fearful horses who-have the most difficulty in novel situations. At the show there are many unusual sights and sounds, such as balloons and loud public address systems, that are never seen or heard at home. An animal with a nervous temperament is calm when in a familiar environment -- he has learned it is safe -- but is more likely to panic when suddenly confronted with new things.

The paradoxical thing about novelty is that it can be extremely attractive to an animal when he can voluntarily approach it. A piece of paper lying in the pasture may be approached by a curious horse, but that same piece of paper lying on the riding trail may make the horse shy. People working with horses and other animals need to think more about how the animals' perceive the situations we put them in.

Listed below are web addresses for other articles written by Temple Grandin, Ph.D.

www.grandin.com/behaviour/principles/flight.zone

www.grandin.com/references/design.construction.facilities.handling.cattle

www.grandin.com/references/new.corral

Stocker Cattle Performance and Pasture Costs

**Dr. Don Ball (Professor Emeritus, Department of Agronomy and Soils)
and Dr. Walt Prevatt (Professor, Department of Agricultural Economics),
Auburn University**

Most livestock producers know, or can easily determine, which forage species and varieties are suited to be grown on land they have available for pasture. However, before making planting decisions, it is critically important to understand the level of animal performance expected from those forages, as well as the cost of that production. Given the recent volatility in production input prices, this is more important than ever.

Many grazing experiments have been conducted that have provided stocker cattle performance data on various forage species. However, because of the expense of conducting grazing research, it is rare to see animal performance comparisons on more than two or three species or species mixtures at a time. Thus, it is difficult for livestock producers to obtain an overall view of the relative productivity of various forages. This article provides a comparison of stocker cattle performance criteria from several selected steer grazing experiments conducted in Alabama. It also provides pasture cost/acre and pasture cost/pound of gain information for the forage crops used in these tests, based on 2008 Auburn University enterprise budgets.

Studies Selected for Comparison

Auburn University scientists have conducted numerous steer grazing experiments that have involved various forage species. In these studies crossbred animals of similar breeding and weights were generally used. While they were not conducted at the same locations or during the exact same years, they were conducted for multiple years and they provide a good basis for comparison of both the animal production potential and the production cost of various forage species commonly used in Alabama.

A test at the Wiregrass Substation (WG) near Headland evaluated steer performance at four nitrogen levels on 'Coastal' bermudagrass and at three levels each on both 'Pensacola' bahiagrass and common bermudagrass. A later study at the Tennessee Valley Substation (TVS) near Belle Mina compared bermudagrass interseeded with either hairy vetch or 'Explorer' rye.

At the Black Belt Substation (BBS) near Marion Junction, the tall fescue varieties 'AU Triumph' (0 percent toxic fungal endophyte) and 'Kentucky 31' tall fescue (having approximately 1, 34, or 90 percent toxic endophyte) were compared. In another study, Kentucky 31 pastures having approximately 5 percent toxic endophyte and 94 percent toxic endophyte were tested. Also at that station, highly toxic endophyte-infected Kentucky 31 fescue and "AP-2," an experimental line of hardinggrass (Phalaris aquatica), were evaluated.

In addition, toxic endophyte-infected tall fescue was grazed in pure stands as well as with either ladino clover or birdsfoot trefoil at the Sand Mountain Substation (SMS) near Crossville. Steer gains on an orchardgrass-ladino clover mixture were obtained in a test at TVS. In another study at TVS, toxic endophyte Kentucky 31 tall fescue and common orchardgrass (both grown with and without 'Regal' white clover) were evaluated.

Continuously grazed 'AU Lotan' sericea lespedeza was compared to rotationally grazed AU Lotan sericea, 'Serala' sericea, and 'Cimarron' alfalfa at the Upper Coastal Plain Substation (UCP) near Winfield. At TVS, 'Funk's 78F' sorghum-sudan was evaluated. Various winter annual mixtures including rye, oats, ryegrass, and crimson clover were tested at the Lower Coastal Plain Substation (LCP) near Camden.

Procedure

To get a clearer view of the performance of stocker cattle on forages, performance criteria for stocker steers grazing the 37 different pasture treatments used in these Auburn University grazing studies were summarized from various research reports and articles. These experimental results provide a basis for comparison of animal performance among the treatments (Table 1). Subsequently, Auburn University 2008 budget estimates for the various forage species or species mixtures involved in these studies were used to determine both the approximate pasture costs/acre and the pasture costs/lb of gain. This information, also in table 1, provides a basis for economic comparison. The ranking (least to most expensive) of variable and total pasture cost of gain for each forage species is also provided.

Animal Performance Comparisons

As expected, the animal performance reported in these experiments varied greatly among the various pasture species or mixtures. The number of calendar grazing days ranged from a low of 77 for sorghum-sudan at TVS to a high of 238 for an orchardgrass-white clover mixture, also at TVS. The variation in calendar grazing days was greater among cool-season species and mixtures than among warm-season species. In comparisons of these studies, neither endophyte status nor presence of a legume companion species seemed to affect the number of grazing days obtained from pasture treatments involving tall fescue (although legumes can lengthen the grazing season in some situations).

High per-day gains (1.7 pounds or more) were obtained with alfalfa, continuously grazed 'AU Lotan' sericea lespedeza, tall fescue having low or medium endophyte infection, common orchardgrass, hardinggrass, orchardgrass with ladino clover, and tall fescue with ladino clover. In several cases in which ADG was high, a relatively short grazing season reduced gain per steer. In other cases, a lower ADG coupled with a long grazing

Table 1. Production and Economic Performance Data for Stocker Steers Using Various Forage Types

Description	Item No	Pasture	Line or Variety	Calendar Days Grazing	Average Grazing Dates	Years of Data	Location[b]
	1	Bermudagrass	Coastal	168	NS[g]	4	WG
	2	Bermudagrass	Coastal	168	NS	4	WG
	3	Bermudagrass	Coastal	168	NS	4	WG
Warm-Season	4	Bermudagrass	Coastal	168	NS	4	WG
Perennial	5	Bahiagrass	Pensacola	168	NS	3	WG
Grasses	6	Bahiagrass	Pensacola	168	NS	3	WG
(WSPG)	7	Bahiagrass	Pensacola	168	NS	3	WG
	8	Bermudagrass	Common	168	NS	3	WG
	9	Bermudagrass	Common	168	NS	3	WG
	10	Bermudagrass	Common	168	NS	3	WG
WSPG	**11**	**Bermudagrass w/Vetch**	**Coastal/Hairy**	**161**	**4/4 -9/27**	**8**	**TVS**
W/Winter	**12**	**Bermudagrassw/Rye**	**Coastal/Explorer**	**161**	**3/19-9/27**	**8**	**TVS**
Annuals							
Summer Annuals	13	Sorghum-Sudan	Funks 78-F	77	6/6-8/22	3	TVS
	14	Alfalfa[h]	Cimarron	163	3/30-9/8	3	UCP
Perennial	**15**	**Sericea Lespedeza[h]**	**Serala**	**139**	**4/22-9/8**	**3**	**UCP**
Legumes	**16**	**Sericea Lespedeza[h]**	**AU Lotan**	**139**	**4/22-9/8**	**3**	**UCP**
	17	**Sericea Lespedeza**	**AU Lotan**	**139**	**4/22-9/8**	**3**	**UCP**
	18	Tall Fescue[i]	AU Triumph (0%)	161	10/5-12/26 & 2/28-5/27	3	BB
	19	Tall Fescue	KY 31 (1%)	161	10/5-12/26 & 2/28-5/27	3	BB
Cool-Season	20	Tall Fescue	KY 31 (34%)	161	10/5-12/26 & 2/28-5/27	3	BB
Perennial	21	Tall Fescue	KY 31 (90%)	161	10/5-12/26 & 2/28-5/27	3	BB
Grasses	22	Tall Fescue	KY 31(<5%)	172	10/23-12/24 & 2/26-6/16	4	BB
	23	Tall Fescue	KY 31 (94%)	172	10/23-12/24 & 2/26-6/16	4	BB
	24	Tall Fescue	KY 31 (>90%)	150	3/18-7/9 & 9/25-11/22	8	TVS
	25	Orchardgrass	Common	139	3/23-7/9 & 9/25-11/11	8	TVS
	26	Tall Fescue	KY 31 (0%)	177	10/17-12/26 & 3/7-5/19	3	BB
	27	Hardinggrass	AP-2	177	10/17-12/26 & 3/7-6/19	3	BB
	28	Tall Fescue	KY 31 (>90%)	206	10/15-1/15 & 3/15-7/19	2	SM
Cool-Season	**29**	**Orchardgrass w/Ladino**	**Hallmark/Regal**	**238**	**9/5-12/5 & 4/1-8/27**	2	**TVS**
Perennial	30	Tall Fescue W/Ladino	KY 31/Regal	143	3/18-7/9 & 9/25-11/15	8	TVS
Grasses	31	Orchardgrass w/Ladino	Common/Regal	143	3/23-7/9 & 9/25-11/15	8	TVS
w/Legumes	**32**	**Tall Fescue w/Ladino**	**KY 31/Regal**	**205**	**10/15-1/15 & 3/15-7/19**	**2**	**SM**
	33	**Tall Fescue w/Birdsfoot**	**KY 31/Fergus**	**194**	**10/15-1/15 & 3/15-7/19**	**2**	**SM**
Winter	**34**	**Rye, Oats & Crm. Clover[j]**	**NS**	**121**	**10/18 – 5/2**	2	**TVS**
Annuals	**35**	**Rye & Ryegrass[k]**	**NS**	**153**	**10/24-5/15**	**7**	**TVS**
	36	Rye, Ryegrass & Crm Clover	NS	177	10/6-5/2	6	BB
	37	Oats & Crm Clover	NS	201	10/29-5/18	2	BB

aData complied from AAES reports (see references). Majority of steers were crossbred with an initial weight of approximately 500 pounds.
bWG = Wiregrass; TVS = Tennessee Valley Station; UCP = Upper Coastal Plains; BB = Black Belt; SM = Sand Mountain
cPut-and-take grazing was employed in most of these tests, which precludes calculation of figures in this column from other data presented. For example, if you multiply Gain Per Steer times the Stocking Rate, the number does not necessarily equal Total Gain, as it normally would.
dVariable costs (2008 estimates) include annual maintenance items such as fertilizer, mowing, etc. (excluding labor).
eTotal costs (2008 estimates) include variable items plus fixed costs associated with establishment and ownership of machinery and equipment.

The ten lowest pasture costs/lb of gain are highlighted

Table 1- Continued

Item No	Nitrogen Rate	Stocking Rate	Average Daily Gain[c]	Total Gain[c]	Gain Per Steer[c]	Variable Pasture Costs[d]	Total Pasture Costs[e]	Variable Pasture Cost		Total Pasture Cost	
								$/lb	Ranking[f]	$/lb	Ranking[f]
	Lb/A/Yr	Head/A	Lb/Head	Lb/A	Lb/Head	$/A	$/A	$/Lb		$/Lb	
1	0	1.40	NS	250	179	26.59	50.04	0.47	8	0.69	14
2	80	1.70	NS	340	200	50.22	75.32	0.54	14	0.71	17
3	160	2.60	NS	480	185	73.85	100.61	0.59	18	0.65	11
4	320	3.50	NS	620	177	121.11	151.18	0.60	19	0.73	18
5	0	1.20	NS	220	183	26.59	43.94	0.54	15	0.73	20
6	80	1.80	NS	290	161	50.22	69.22	0.63	22	0.80	24
7	160	2.00	NS	350	175	73.85	94.51	0.70	26	0.86	28
8	0	0.70	NS	100	143	26.59	43.83	1.18	35	1.33	35
9	80	1.40	NS	230	164	50.22	69.12	0.79	31	0.88	29
10	160	1.80	NS	300	167	73.85	94.40	0.82	32	0.90	30
11	**0**	**2.26**	**1.29**	**493**	**218**	**47.46**	**73.05**	**0.35**	**5**	**0.47**	**4**
12	**150**	**2.45**	**1.30**	**530**	**216**	**94.89**	**123.81**	**0.49**	**9**	**0.62**	**9**
13	100	2.80	1.10	210	84	78.96	93.89	1.18	36	1.35	36
14	0	1.30	2.16	475	352	51.49	131.51	0.51	10	0.91	31
15	**0**	**1.30**	**1.39**	**248**	**193**	**21.49**	**37.54**	**0.42**	**7**	**0.60**	**7**
16	**0**	**1.20**	**1.65**	**276**	**229**	**21.49**	**37.54**	**0.37**	**6**	**0.54**	**6**
17	**0**	**1.20**	**1.87**	**306**	**260**	**21.49**	**37.54**	**0.34**	**4**	**0.49**	**5**
18	200	1.54	2.09	519	336	89.85	112.01	0.55	17	0.65	12
19	200	1.32	2.16	462	348	89.85	112.01	0.61	21	0.73	19
20	200	1.40	1.76	397	283	89.85	111.44	0.71	28	0.85	26
21	200	1.77	1.41	370	227	89.85	111.44	0.77	30	0.91	32

Item No	Nitrogen Rate	Stocking Rate	Average Daily Gain[c]	Total Gain[c]	Gain Per Steer[c]	Variable Pasture Costs[d]	Total Pasture Costs[e]	Variable Pasture Cost		Total Pasture Cost	
								$/lb	Ranking[f]	$/lb	Ranking[f]
	Lb/A/Yr	Head/A	Lb/Head	Lb/A	Lb/Head	$/A	$/A	$/Lb		$/Lb	
22	200	1.32	1.82	426	323	89.85	112.01	0.67	25	0.79	23
23	200	1.73	1.00	301	174	89.85	111.44	0.94	34	1.12	34
24	150	2.13	1.31	268	126	75.08	95.64	0.91	33	1.11	33
25	150	1.27	1.77	200	157	75.08	97.00	1.22	37	1.49	37
26	200	1.40	1.78	434	310	89.85	112.01	0.65	23	0.78	21
27	200	1.26	1.73	347	275	89.85	112.86	0.70	27	0.85	27
28	150	1.76	1.06	374	218	75.08	95.64	0.65	24	0.79	22
29	**0**	**1.97**	**1.62**	**576**	**292**	**38.83**	**58.85**	**0.22**	**2**	**0.30**	**2**
30	0	1.81	1.46	244	135	38.83	57.49	0.52	12	0.71	16
31	0	1.46	1.83	244	167	38.83	58.85	0.52	12	0.71	15
32	**0**	**1.63**	**1.53**	**582**	**314**	**38.83**	**57.49**	**0.22**	**1**	**0.30**	**1**
33	**0**	**1.24**	**1.51**	**398**	**293**	**57.43**	**77.40**	**0.32**	**3**	**0.44**	**3**
34	**130**	**2.00**	**1.37**	**544**	**272**	**97.07**	**111.50**	**0.59**	**18**	**0.65**	**10**
35	**130**	**1.86**	**1.36**	**528**	**278**	**91.71**	**105.77**	**0.54**	**16**	**0.60**	**8**
36	100	1.31	1.57	364	278	94.85	109.13	0.76	29	0.85	25
37	100	1.38	1.60	443	321	86.04	99.70	0.61	20	0.68	13

fRanking Based on lowest to highest; fractional differences not shown allowed separation of treatments rounded to the same cost/lb.
gNS = Not Specified.
hRotationally grazed.
iTall fescue varieties, where indicated, are identified by percentage of endophyte infestation.
jAverage of 78 days of grazing; dates not specified.
kAverage of 52 days of grazing; dates not specified

The gain per acre was at least 475 pounds on ten of the pasture treatments. These were alfalfa, Coastal bermudagrass receiving at least 160 pounds of nitrogen per acre, Coastal bermudagrass overseeded with vetch or rye, endophyte-free AU Triumph tall fescue, endophyte-infected tall fescue-white clover (SM), Hallmark orchardgrass-white clover, and with two of the four winter annual mixtures. The lowest gain per acre (100 pounds) was obtained on common bermudagrass receiving no nitrogen fertilizer.

Notable Points Revealed

*The seven lowest total pasture costs/lb of gain and eight of the ten lowest total pasture costs/lb of gain involved legumes (Table 2).

*The seven lowest total pasture costs/lb of gain and eight of the ten lowest total pasture costs/lb of gain involved perennials.

*The range of total pasture costs/lb of gain (lowest to highest) is much broader than it was in the early 1990s when a similar exercise (calculating pastures costs using this data) was conducted. This provides evidence that as input costs increase, producers need to be increasingly focused on costs and returns to guide their decisions.

*Forage yield is an important economic factor, as evidenced by the fact that in the Wiregrass test, total pasture costs/lb of gain for Coastal bermudagrass were less than for bahiagrass, and those for bahiagrass were less than for common bermudagrass. The forage quality of these three is similar, so the primary difference in pasture cost/lb of gain was production/acre. Data from this test also indicate that application of nitrogen is a more cost efficient practice (results in more dry matter production/lb of N applied) on some forage crops than on others.

*Coastal bermudagrass overseeded with vetch was a lower-cost treatment than any of the other warm-season perennial grass treatments, which suggests that overseeding a legume can be a cost effective practice.

*Use of a sorghum/sudangrass hybrid was a very expensive option. Both average daily gain and calendar days of grazing provided by this grass were low as compared to most other treatments.

*In general, the higher the percentage infection by toxic endophyte in tall fescue, the more costly the gains. For example, among treatments at the Black Belt the total pasture cost/lb of gain was almost double ($1.12/lb vs $0.65/lb) in the high- versus low-endophyte treatments.

*Adding legumes to either tall fescue or orchardgrass substantially lowered pasture cost/lb of gain. In fact, this management practice resulted in the lowest three pasture costs/lb of gain of the 37 forage alternatives evaluated.

Table 2. The Ten Lowest Calculated Pasture Costs/lb of Gain

Pasture Type	Line or Variety	Grazing Days	Grazing Dates	ADG	Pasture Cost/Ac	Pasture Cost/lb
Tall Fescue w/Ladino	KY 31/ Regal	205	10/15-1/15 & 3/15-7/19	1.53	$172.26	$0.30
Orchardgrass w/Ladino	Hallmark/ Regal	238	9/5-12/5 & 3/15-7/20	1.62	$172.08	$0.30
Tall Fescue w/Birdsfoot	KY 31/ Fergus	194	10/15-1/15 & 3/15-7/20	1.51	$173.28	$0.44
Bermudagrass w/Vetch	Coastal/ Hairy	161	4/4-9/27	1.29	$230.75	$0.47
Sericea Lespedeza	AU Lotan	139	4/22-9/8	1.87	$148.84	$0.49
Sericea Lespedeza	AU Lotan	139	4/22-9/8	1.65	$148.84	$0.54
Sericea Lespedeza	Serala	139	4/22-9/8	1.39	$148.84	$0.60
Rye & Ryegrass	NS*	153	10/24-5/15	1.36	$318.34	$0.60
Bermudagrass w/Rye	Coastal/ Explorer	161	3/19-9/27	1.30	$328.35	$0.62
Rye, Oats & Crim. Clover	NS*	121	10/18-5/2	1.37	$352.78	$0.65

*NS = None Stated

*It appears that both improved forage quality and reduction of the amount of fertilizer nitrogen used were factors that substantially lowered total pasture cost/lb of gain when legumes were included in stocker cattle pastures. An important concept is that stocker cattle producers who are able to increase animal performance via providing higher quality pasture and/or who are able to lower fertilizer inputs (with legumes or by other means) can achieve lower pasture costs/acre and lower costs/lb of gain.

*Of the 37 forage treatments, only five had less than a $0.50 total cost/lb of gain. Careful assessment of performance and pasture cost/lb of gain are the crux of sound pasture decisions.

Other Factors to Consider

Various types and classes of livestock have different nutritional requirements. The data in this publication pertain to stocker-steer tests, but it should facilitate obtaining a better understanding of the relative level and duration of nutrition provided by these forage species and mixtures to other types of livestock

While valuable for the purpose of making general comparisons, various animal or plant factors can influence such results. Pasture cost values provided were calculated assuming the application of recommended management practices with commercially purchased inputs as reflected in 2008 Auburn University forage crop budgets. In addition, although pasture cost/lb of gain is an important measure of production efficiency, it does not take into consideration seasonal price fluctuations (buy-sell relationships) or other expenses associated with owning animals over time.

In addition, animal management and marketing costs should always be considered when evaluating forage and livestock systems. For example, the pasture costs/lb of gain for some of the warm-season perennial grass treatments are relatively low. However, few stocker cattle operations of this type exist in most years due to unfavorable buy-sell price margins during this time of year. In addition, greater production and marketing risks are associated with higher stocking rates and higher nitrogen fertilization levels required for high per-acre gains with warm-season perennial forage species. Also, the market for animals coming off warm-season species is usually poorer than for animals coming off cool season species. As a result, summer stocker programs are usually difficult to justify.

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Trichomoniasis

Craig Payne, DVM, MS
Director, Veterinary Extension & Continuing Education

Description of the disease

Trichomoniasis, or "Trich," is a venereal disease of cattle caused by a protozoan parasite, Tritrichomonas foetus. Up until the last few years, this disease was almost non-existent in Missouri but now it is being diagnosed with greater frequency throughout the state. Symptoms of an infected herd appear as an excessive number of open cows (30 – 50% on average) and/or a calving interval that is prolonged over several months. This disease can have a devastating financial impact because of poor calf crops and expenses associated with cleaning up an infected herd.

Bulls are the primary source of infection in a herd and older bulls (3+ years) are likely to be permanently infected. The protozoa are found on the bull's penis and prepuce and are transmitted to the cow during breeding. The initial infection in the cow usually does not interfere with conception but rather results in death of the embryo at 50 to 70 days of gestation on average. Cows and heifers typically return to estrus (heat) one to three months after breeding, but a period of infertility may last for two to six months as a result of the infection. Some infected cows may develop pus in the uterus while others may abort in later gestation. Occasionally, cows may become permanently infected, yet be able to deliver a normal calf. This condition is rare but of concern, because these animals can serve as a source of infection to bulls in the following breeding season.

If trich is suspected, your veterinarian is the most qualified person to collect samples and make the diagnosis. Samples are usually collected from the bulls only since they are a common carrier of the organism, but uterine/vaginal fluid may be collected from individual cows under certain circumstances. In the bull, the number of organisms cultured from the prepuce can be increased if he is isolated from females for one to two weeks prior to sampling. If trich is diagnosed, there is no treatment. Instead, infected bulls will need to be removed, open cows should be culled and only tested free bulls or virgin bulls should bought for replacements.

Where has Trich been found in Missouri?

Since March of 2010, Dr. Linda Hickam at the state veterinary office has been monitoring the number and origin of positive Trich samples coming through the MU College of Veterinary Medicine Diagnostic Laboratory and the state veterinary diagnostic lab in Springfield. With this information, she has created maps which show the counties where the positive samples have come from as well as the number of positive samples within each county.

Figure 1 (page 26) is the most recent map available and indicates that from March 1, 2010 through April 30, 2011 there were 30 counties where Trich had been diagnosed. Please be aware this map does not include results from samples that were sent to diagnostic laboratories in other states and therefore it likely under estimates the number of positive animals and the number of counties where Trich has been found.

New intrastate regulations for Missouri

On September 1st, Missouri began enforcing Trichomoniasis regulations for bulls which are sold, leased, bartered or traded within the state. These regulations require that all non-virgin bulls and all bulls over the age of 30 months* (24 months if entering a livestock market) be tested for Trichomoniasis.

Bulls that are exempted from testing include the following:

- Those going directly to slaughter
- Those sold through a livestock market that are going directly to slaughter
- Buffalo
- Exotic bovids
- Virgin bulls under 30 months of age for private treaty*
- Virgin bulls under 24 months of age marketed through livestock markets

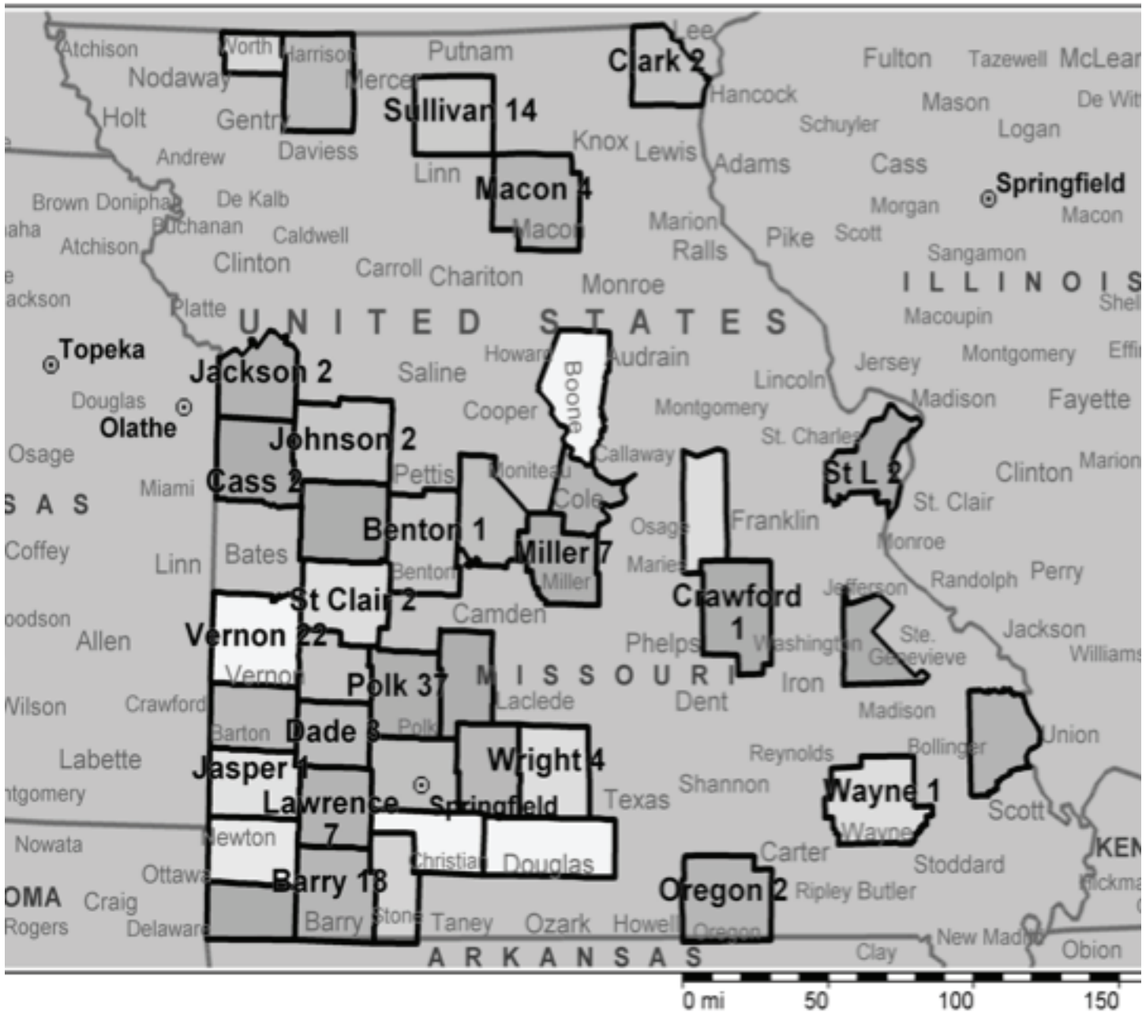


Figure 1. Number of cases of Trichomoniasis by county from March 1, 2010 – April 30, 2011.

In addition to testing the regulations also address how positive bulls are to be handled as well as the herd from which the bulls originated. The regulations are as follows:

- Positive bulls will be sent to slaughter, either directly or sold for slaughter through a livestock market
- The herds of origin for the Trich positive bull(s) will be quarantined or sent to slaughter
- If quarantined, the remaining bulls will be released after two negative test results. Females in the herd(s) which are 120 days or less pregnant will be quarantined until isolation from any bulls for a period of 120 days. Females confirmed at least 120 days pregnant or have a calf at side with no known exposure to a positive bull will not be quarantined. Virgin heifers and non-test eligible bulls will not be quarantined.

*** On January 1st, 2012, the age will change from thirty (30) months to twenty four (24) months of age.**

Profiting from Woodlands Diversification on the Farm

Robert DeMoss, Forester, NRCS, Ava, MO

Missouri's forests consist of approximately 2 million acres of which 83% is privately owned. Many of these acres are located on farms that are focused on annual incomes through animal/hay production or row crops. For the most part, the wooded acres are considered idle areas that have none or limited forest management and have been ignored as a resource that can provide sustainable income to the farm with the exception of a harvest that may occur once a generation in the family ownership.

Many owners attempt to convert woodlands to pasture through land clearing, but this only produces marginal pasture, at best, without substantial investments in fertilizer, lime, and brush control for numerous years. Much of the time, these situations would have been more profitable with management focused on the woodlands.

Woodlands provide diversity in farm investment much like diversity investing in bonds versus stocks. Generally, woodland income will be periodic as opposed to annual payments. The frequency of those payments can be modified through such things as forest stand improvement and agroforestry practices.

Forest stand improvement improves growing conditions and shortens the time it takes to grow a tree to commercial value. The process involves removing undesirable species and poorly formed trees, i.e. crooks and forks, providing more space for sunlight to reach the forest floor, and increasing the amount of available moisture and nutrients in the soil to the residual trees. Cut trees can be used for firewood that either is used for personal heat source or sold to cover costs of the thinning. The result is that more volume can be grown in a shorter amount of time with fewer trees per acre.

To take management to the next level in intensity, farmers can apply agroforestry. Agroforestry is the integration of forest crops into traditional farming. This opens the door for options that may at first seem unrealistic, but something that should be considered by those that demand diversity in their farms. Crops that may be harvested range from blackberries to filberts to chestnuts, walnuts, or pecans. These species can be established on borders of fields or in rows dividing fields that can be strip grazed or hayed. Less intensity systems can consist of forest farming in the understory of existing woodlands and keep management of grass and woods separate. Understory farming can be lucrative through local markets such as mushroom farming or in pine stands, pine straw for mulch.

Farms can become more profitable focusing attention on costs rather than sources of income. Windbreaks around homesteads can reduce winter heating costs by as much as 30%- 40%. Windbreaks can also benefit livestock around winter feeding operations by reducing stress.

While these practices may require upfront costs to establish, cost share assistance may be available to those who qualify. Avenues to pursue are local soil and water districts, Missouri Dept. of Conservation, and Natural Resources Conservation Service.

Managing the Spring Flush

Mark Kennedy

State Grazinglands Specialist, USDA-NRCS, Houston, MO

Introduction

For most graziers the time of year is quickly approaching when keeping pastures vegetative is the toughest chore they face. Managing the fast growing spring growth is important to maintain adequate quality and quantity forage for the rest of the growing season. This "spring flush" occurs in cool season grasses because the optimum temperature for growth occurs at the time when the most important nutrient for growth, water, is readily available. Growth of cool season grasses and most legumes are greatest in the spring when the air temperature is 60 – 85 degrees.

Cool season grasses will produce about two-thirds of their annual growth by the first of July. If your stocking rate is matched to your total annual forage production, there is no way your livestock will be able to keep up with the flush of grass growth that will occur in late April and May. Coupled with this explosion of grass growth is a physiological response to shorter nights and longer days that triggers seed head formation starting sometime in early to mid May. So, not only is more forage being produced than can be grazed, the quality starts dropping daily as seed head formation begins. This process is hard to fight.

While there are no easy solutions, if we use our knowledge of basic plant growth in combination with some grazing management principles, we can come up with a few grazing management strategies that will help us manage forage through this period. The grazing strategies that we will discuss are:

1. Reduce or use nitrogen fertilizer wisely
2. Start early and rotate rapidly
3. Clip excess growth following grazing
4. Drop paddocks out of the rotation
   a. Cut for hay
   b. Let the paddocks grow and graze later using a high stock density
5. Convert some paddocks to warm season grass
6. Increase stocking rate in the spring
   a. Bring in extra livestock just for the spring season
   b. Switch to fall calving

Reduce or use nitrogen fertilizer wisely

Most producers put nitrogen fertilizer on cool season grass pastures in February or March to give the fertilizer a chance to become plant available by the time growth starts in the spring. Doing this only compounds the difficulty of managing the spring flush. Adding nitrogen fertilizer at this time will only speed up the grass growth process and produce more forage during a time when there is more forage than we can graze. A different approach would be to delay applying nitrogen until early May. By applying nitrogen in early May to pastures that have been kept vegetative you get a lower yield but also shift the extra yield further into the summer when more production is needed. Thus you will have a lower yield increase during early spring but the additional forage grown later in the growing season will be more valuable. Another option would be to not apply any nitrogen in the spring to keep spring growth a little lower and add all nitrogen in late summer to increase fall production for winter grazing. This option also shifts the additional growth from fertilizer to a time when the extra growth will be more beneficial.

Start early and rotate rapidly

Turn out on spring pasture when there is 3 to 4 inches of new growth and supplement with hay as needed for adequate dry matter intake. Rotate rapidly allowing for a 15 to 20 day rest period. Pastures should reach a 6 to 8 inch height before grazing again. This will help stagger forage growth, keep plants more vegetative and reduce seedhead formation as the season progresses. This is what we would call setting the grazing wedge. Utilizing higher stock densities will help insure more uniform grazing so that some plants are not rejected and given time to go into the seedhead formation stage. This is a good strategy, but is easier said than done without incorporating some combination of the other spring grazing management strategies.

Clip excess growth following grazing

If you were unable to get stock densities high enough to prevent selective grazing, then clipping pastures may be an option to help maintain forage quality. After the second week of May, if you have fescue plants that have been refused to this point, they will likely not be grazed in subsequent rotations due to advancing maturity, lower quality and higher toxicity levels. If there are quite a few ungrazed plants then clipping or mowing should be considered. This will stop seed head formation, allow for more uniform, vegetative regrowth, and reduce shading of other plants allowing for more diversity of favorable plants (especially legumes). The drawback to clipping pastures is that it can be very time consuming, not to mention the fuel and machinery costs that are incurred.

Drop paddocks out of the rotation

If your stocking rate is matched to the total forage production for the year, then all of the paddocks won't be needed during the spring season. Paddocks will need to be dropped out of the rotation to make it easier to manage the spring growth. Any paddocks that had pugging or trampling damage from the previous winter grazing would benefit from an extended rest period. Also, any paddocks needing renovating because of thinning stands due to drought would be good candidates to drop out of the spring grazing rotation.

Another option is to drop some paddocks out of the grazing rotation and cut them for hay by mid-May and put them back in the rotation for grazing in the summer. More than likely, 50% of the paddocks will need to be dropped out of the spring grazing rotation in order to manage the spring flush on the rest of the paddocks. This will provide a hay supply for winter or as emergency feed in case of a summer drought. Remember, when you cut and remove hay, a significant amount of plant nutrients are removed. Those nutrients will need to be replaced by either feeding hay back on those paddocks that were cut or by fertilizing. Next, divide the remaining paddocks to be grazed in half using polywire. This will increase the stock density, but not the stocking rate. This will allow for a faster rotation which will help keep plants more vegetative. This also reduces selective grazing and paddocks are grazed more uniformly, reducing the number of ungrazed plants. Pasture utilization is increased reducing the need to clip. Keep practicing good grazing management, turn into a new paddock when it has 6 – 8 inches of growth and don't graze below 2.5 – 3 inches.

If cutting excess growth for hay is not feasible then letting the paddocks grow and become more mature may be an option if a high stock density (HSD) can be employed to utilize the forage. Under high stock densities (aka Mob Grazing) livestock will select the best quality forage and trample the more stemmy material into the soil surface. Combined with the uniform manure distribution that accompanies HSD this results in a mulch layer covering the soil surface that conserves soil moisture, provides a favorable environment for nutrient cycling and improves soil health. If the stock density is high enough there should not be any need to mow or clip the pasture after grazing. The stock density that would allow this to work would be at least 150,000 pounds animal liveweight per acre. This would equate to one hundred twenty 1250 pound cows on an acre, or 60 cows on ½ acre or 30 cows on ¼ acre. This requires short grazing periods of 1 day or less. This

increases the need to monitor pasture and animals more closely. Care should be taken that animal performance does not suffer. Animals with lower nutrient requirements (dry cows) should be used to clean up these type pastures.

Convert some paddocks to warm season grasses

One of the big benefits of warm season grasses is the ability to better manage the spring growth by having fewer cool season pastures to graze during April and May. This is one way to be able to drop some paddocks out of the early spring rotation without having to cut them for hay. These paddocks can be saved for grazing in June – September when extra forage is needed. For year round grazing systems, 25% to 30% of the pasture acreage should be converted to warm season grass. Adding these grasses to forage systems has resulted in increased gains and improved livestock performance during the summer months when cool-season grasses are at their low point of growth and quality. Warm season grasses are highly palatable to livestock prior to heading and can produce beef gains of over 2 pounds per day during the summer season. Graziers should take advantage of the inherent differences in the seasonal growth cycles of various forages to supply desirable forage to livestock throughout the grazing season.

Increase stocking rates in the spring

Some producers successfully manage the spring flush by bringing in additional livestock during the spring phase and then reduce the stocking rate as grass growth slows down. This can be accomplished by purchasing additional livestock such as stocker calves that are purchased in March and sold by early July. This would match livestock demand with forage growth and allow for the additional spring growth to be utilized more efficiently. The same thing could be done by contract grazing stocker calves or dry cows. These options allow for additional income from the additional forage.

Another way to increase stocking rates in the spring, without having to bring in outside animals, would be to switch to fall calving. Fall calving has many advantages in this area. Fall born calves are heavy enough in the spring to effectively utilize the extra grass and can be sold as grass growth slows down. This offers more flexibility in marketing, also. Conception rates tend to be 10 to 15% higher for fall calving herds versus spring herds on endophyte infected fescue. Calves can be weaned in the spring and grazed until early summer utilizing a leader/follower grazing system. In this system the weaned calves would be allowed to top the pastures taking the highest quality forage. The cows that are now dry would follow right behind them and clean up the remainder of the forage. This is lower quality forage but is more than adequate for dry beef cows. Recent work at the Forage Systems Research Center by Sexton, etal shows that delayed weaning of fall born calves from mature cows may be a viable option. The delayed weaning increased calf gain but reduced cow gain. However, cows were maintained in acceptable condition prior to calving (>6.0). In cases where fall calving cows are in adequate condition the opportunity to delay weaning until late spring or early summer offers forage management and marketing opportunities. As forage supplies decline due to heat or drought, weaning timing can be matched to the available forage supply.

Summary

Managing the spring flush is where the “art of Management-intensive Grazing” comes in to play. Most graziers struggle with the spring flush of growth, seedhead development, rapidly maturing grass and uneven, selective grazing. If we use our knowledge of basic plant growth in combination with some grazing management principles, we can utilize some grazing management strategies that will help us manage forage through this period. Expecting different results this year without changing management strategies is wishful thinking. To quote an old anonymous saying “if you always do what you’ve always done, you always get what you always got.” Management strategies are available to help manage the spring flush. Are you ready and willing to employ them?

The Role of Forages in the Changing Beef Industry

Dr. Scott Brown
Livestock Economist, University of Missouri

Introduction

The cost of producing livestock products has increased dramatically over the past few years as strong demand for feedstuffs has driven feed costs to record-setting levels. There is much speculation about the root cause of the large price increases in commodities such as corn, but it is clear that the strong demand that exists for corn today goes well beyond the amount of corn used in the ethanol industry. For many in the livestock industry, the focus now should turn to how to best feed livestock in this new era of higher feed costs. It remains a challenging time for livestock producers to choose how to market and feed animals.

The high feed costs provide different challenges and opportunities to each of the livestock sectors. In the case of the poultry sector there is very little flexibility in feeding alternatives. The production process is nearly fixed and the feedstuffs that can comprise a poultry ration tend to be highly correlated with each other. That severely limits the feasible alternatives that could provide a reduction in feed costs. This appears to be one of the issues that have caused the current bleak financial situation for the poultry complex. Although there is more flexibility in the pork industry, it is also limited in viable feeding alternatives.

The cattle production process differs from these industries, however, and what many have often cited as a negative for beef producers is a positive when it comes to feeding flexibility. The production lag that exists from the time a decision is made to alter beef supply until the product reaches its final consumers is measured in years, not days or months. While it can be frustrating that this longer process greatly lags the economic signals that prompted it in the first place, it does allow for more flexibility in a feeding plan.

In addition to the production lag, the cattle production process often occurs across several participants: cow-calf producers, backgrounders, and feedlots. This results in alternative production paths being available to cattle that do not exist in the other livestock species.

This production flexibility and time lag in the cattle industry has opened much discussion about the “right” way to feed cattle in this high feed cost environment. Many industry observers have speculated that with high grain and protein prices, forages need to play a larger role in the cattle production process. The backgrounding of cattle for a longer period of time to add weight and reduce the pounds needed to be put on cattle in the feedlot has been posited as a logical strategic response by the cattle industry to record-high grain and protein prices.

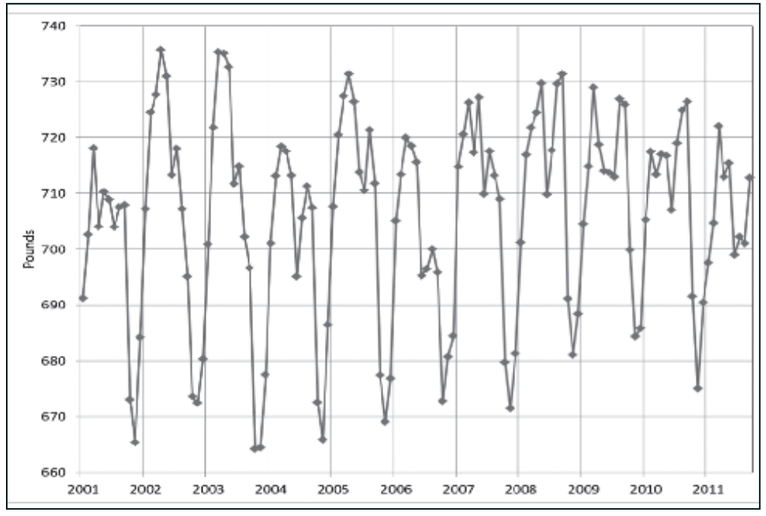
The cattle industry has had to deal with high feed costs for a few years now. It has been long enough that we can begin to examine the available data and observe the changes in feeding practices that are occurring. This can shed light on whether forages have played a larger role in cattle production in response to the record-high grain and protein prices.

Current Data Paints a Blurry Picture Regarding Forage Use

The first and most obvious piece of data to examine in determining whether the cattle industry has been increasing the use of forages is to look at the placement weights of cattle entering the feedlot. Average placement weights should increase if the industry is keeping cattle on grass for a longer period of time. By assuming some simple distributions of cattle within the weigh breakouts reported by USDA, figure one provides a glimpse of average monthly placement weights.

Figure one shows there is a strong seasonal pattern to placement weights. In the late fall, placement weights are at their lowest as a portion of the spring calf crop enters the feedlot while placement weights rise in the first half of the year as more yearling animals are placed in the feedlot.

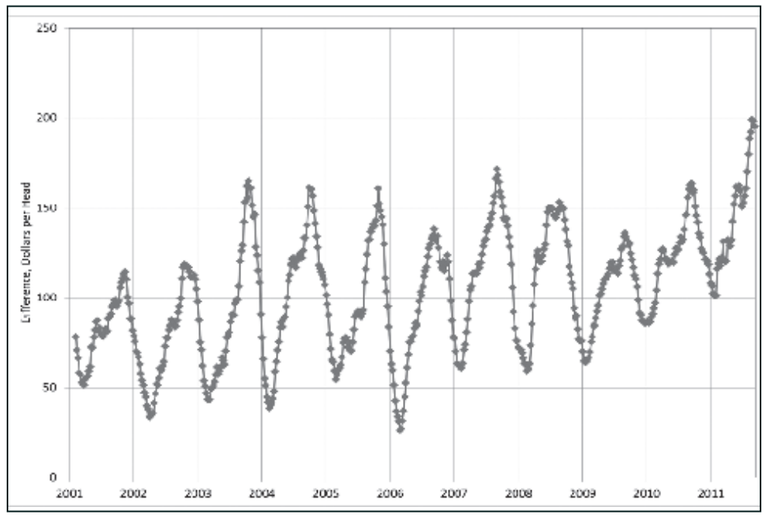
Figure 1. Average Weight of Cattle Placed on Feed, Monthly



This data should show higher placement weights in periods of high grain and protein feed costs if the industry switches to a production process that incorporates more forages. Corn prices generally began their increase in early 2007 but did not reach their first peak until mid-2008. The late fall placement weights in 2008 and 2009 do in fact show higher weights in those two years of high grain prices relative to the late-fall 2007 placement weights. However, it is difficult to find other periods on the graph that definitively show higher placement weights in periods of high grain prices. Given the increase in grain prices in 2011, it is surprising not to have seen feedlot placement weights growing this year. Other factors can certainly mask the effect of high grain prices and the drought situation in the Southern Plains may have contributed to the lack of an increase in placement weights in 2011.

Another way to begin to examine the effects of record-high grain prices is to see how the value of cattle changes as weight increases. Figure two plots the difference between the value of a 575 pound animal versus a 725 pound animal on a weekly basis. The data is a six week moving average to reduce some of the volatility that is present in weekly cattle prices.

Figure 2. Difference in the Value of Missouri 725 Pound Cattle and 575 Pound Cattle, Weekly, 6 Week Moving Average



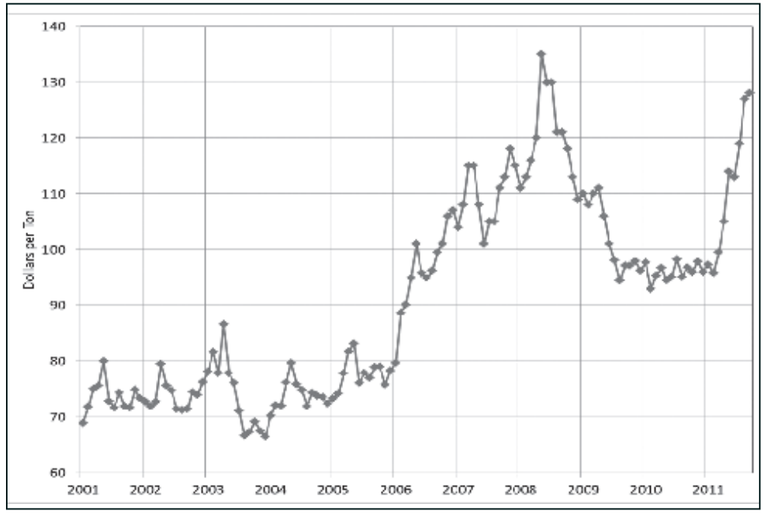
There is also seasonality present in this data series, with higher weight cattle worth more relative to lower weight cattle in the later fall period. That quickly changes after the first of the year as heavier weight yearlings begin to come to market.

Figure two suggests that on average it pays to buy the 575 animal and background it to 725 pounds only if the cost of this activity does not exceed $100 per head. However, there has been a positive trend in the difference in values the past few years. The 2009 fall peak shows a value difference of $134 per head but this had expanded to near $200 per head in late 2011, suggesting that heavier weight cattle have become more valuable relative to their lighter weight counterparts over the past three years. This increase in the value of higher weight cattle has allowed the cost of gain that can be profitably covered to increase by $100 per head since the beginning of 2011. Again the real question that a prospective backgrounder needs to ask is how the cost of getting the additional weight gain compares with the value difference shown in this graph.

The cost of hay is an important factor in determining whether employing a larger portion of forages into cattle diets leads to a profitable outcome. As shown in figure three, hay prices as measured by USDA's other hay price (excluding alfalfa) have been increasing just as grain and protein meal prices have increased. This effect is important to highlight and may moderate the economic advantage of increasing the portion of cattle diets that comes from hay.

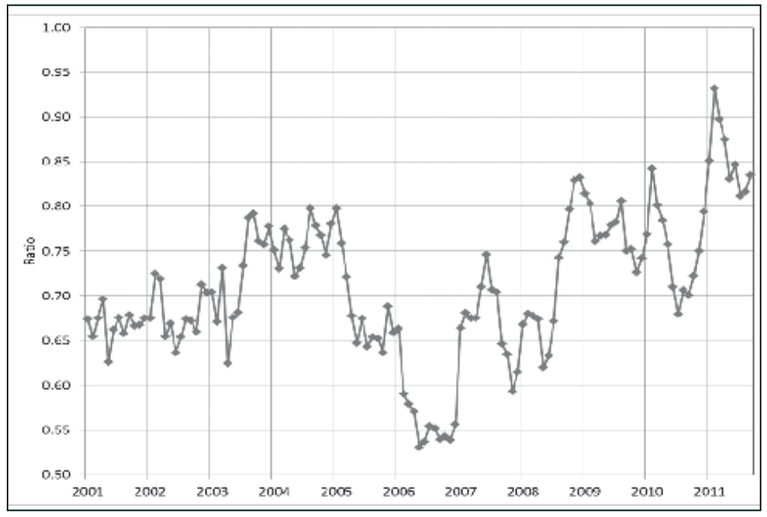
Just as it makes economic sense to substitute cheaper feed sources into cattle rations, those with land that find a cropping enterprise has become more profitable than hay or pasture alternatives may convert that pasture or hay area into corn or soybeans. In short, the economic incentives to use more forages in the cattle industry may become muted over time as all commodity prices rebalance to efficiently allocate the limited land resources available.

Figure 3. U.S. Other Hay Price, Monthly



Perhaps a better way to examine the incentive to use more forages in growing cattle is to compare the cost of gain in the feedlot relative to hay prices. Figure four provides the ratio on a monthly basis of the cost of feedlot gain as reported by Kansas State University relative to USDA's price of other hay over the past ten years. This provides more evidence that the incentive to use more forages has been growing over the past five years. This picture tends to coincide with figure two in that heavier weight cattle have been growing in value just as the cost of feedlot gain has been growing relative to the other hay price. It is important to note the change in 2011 that is occurring in that the ratio of cost of gain relative to the other hay price peaked early in 2011. Rising hay prices in 2011 have moderated rising and record corn prices in 2011 and moderated the incentive to increase forage use.

Figure 4. Ratio of KSU Feedlot Cost of Gain to the U.S. Other Hay Price, Monthly



Summary

There is no simple or easy answer as to whether increased forage use in cattle production is a profitable way to combat high corn prices. There are many factors at play that change over time and the best choice in forage use today may not be the best choice at some point in the future.

In general, these points are important to determine the correct strategy when looking at the use of forages relative to corn:

1) The relative price of forages to grains. Over the long term these relative prices should rise in a similar fashion as both supply and demand for these alternative feed stuffs adjust to the changing economic picture. However, in the short run there could be significant deviations and producers should take advantage when possible of forage alternatives relative to grain alternatives. Individual producer hay costs can deviate substantially across the country and some areas may find feeding forages a good choice while at the same time other areas will not.

2) The downstream effects of changing the use of forage must be considered when it comes to feedlot performance. Although bringing heavier weight cattle into the feedlot reduces the weight gain needed to finish these cattle, often these cattle are not as efficient at converting feed as lighter weight cattle.

3) The downstream effect on the quality of beef produced is an important part of the equation. A few months ago select and choice cattle grades were very similar. Recently, cattle that grade choice and higher have commanded much larger premiums. It appears that demand for higher-quality cattle will remain strong suggesting that the choice of forage use must not diminish the quality grade of cattle.

4) Economic incentives to use more forage in cattle diets likely also shift more area from hay and pasture to grain production. That will moderate the relative feeding values over the longer term so that further adjustment may be necessary in feed types used in the cattle industry.

5) The cattle industry will find itself in very short supplies of calves in the next couple of years given the declining beef cow herd. This will cause aggressive feedlot bids for calves and may pull lighter weight cattle into feedlots as feedlot operators try and keep feedlots at capacity. This factor will reduce the incentive to background cattle to heavier weights.

Carrying Capacity – A Balancing Act

Myron Hartzell, Resource Conservationist
USDA Natural Resources Conservation Service

Trying to adequately feed livestock good quality feed at the most profitable rate while maintaining sustainable resource conditions can be a tricky goal to accomplish. None the less, it should be in the mind of every livestock producer as a normal mode of operation. Grazed forages of good quality are the cheapest feed source as a rule in the Ozarks. While some alternate feedstuffs may appear cheap at times, bringing in outside inputs is always more expensive when time, fuel and labor are taken into account. To graze good quality forages year after year requires a balance of healthy livestock with the excess production of the forage plants.

Excess production is that generous growth that is over and above what is needed for the plants to thrive in the system every year. This is referred to as harvestable forage. While we can take more, we must ask ourselves, should we and what is the ultimate cost? A certain amount of residual plant material needs to be left for the health and function of the plant. As a general rule, a take half and leave half philosophy works well for an individual grazing event in a field. For cool season forages such as fescue and orchard grass it can also be viewed as turn in at wrist height and out as finger depth. These are average heights for the forages in the field. Grazing too hard as a result of overstocking is a gradual mining operation where the resources are depleted. At some point these weakened forages are unable to out compete weeds, survive droughts and feed livestock.

There are many variables that go into deciding how many of your animals you need to put on your system or on an individual field for a time period. First and foremost is an honest evaluation of present resources. An honest evaluation is a reality check and honesty with yourself. Sometimes it is hard to admit that your stand of grass is not as good as the neighbors' field. But fudging in these evaluations will lead to a miscalculation of the approximate carrying capacity and degradation of the productivity of the stand.

Soil properties, fertility levels and stand condition all go into estimating the productivity of a stand. Guides on estimating these factors for your farm can be obtained from your local USDA service center office or on the internet. In addition to annual production, forages also have seasonal distribution. For tall fescue, two thirds of the annual growth occurs in the spring and one third in the fall. Animal intake needs may or may not fit this cycle. In the case of fall calving cows or fall purchased stockers, the highest season of demand is also the highest of forage productions so animals are more nearly balanced with forages. Adjustments can be made in other situations to discover what best fits your goals and resources. These can vary from changing forage types to adding or subtracting animals to adjust to available forages.

One of the hardest disciplines is that of culling cows. Too often we hang on to too many mouths for too long, hoping that normal summer drought situation will get better and solve itself, when in reality retaining possible cull cows creates two problems. The market for the cattle goes down and possible cull cows will forage on additional pasture and increase supplemental food costs when the time comes. No matter how good your herd is, theoretically, half of the animals are below your herd average. And we all know which animals we would rather lightening strike if given a choice. Of course that answer would be none.

A spreadsheet tool named Graze4 for determining forage growth and animal needs is available on the Missouri state NRCS website. This inventory will give you a growth curve chart of total grazeable forages by month for the year as well as herd needs and numerical summary also. It does a very good job of showing a total system balance for the year. A less detailed but faster version is available on request by contacting myron.hartzell@mo.usda.gov . This version may be more useful in calculating short term carrying capacities of individual fields.

Good preplanning estimates based on average conditions get you in the proper ballpark where adjustments for better or worse than average adjustments can be more easily made. Planning information for making these decisions or assistance in planning can be obtained from you local USDA service center office or the Missouri NRCS website at http://www.mo.nrcs.usda.gov/technical/

Can I Afford to Fertilize?

Dr. Will McClain, Agronomy Specialist
MU Extension, Steelville, MO

Can I Afford to Fertilize?

Will McClain
Agronomy Specialist
mcclainw@missouri.edu
(573) 775-2138
UNIVERSITY OF MISSOURI Extension

It Depends

- Resource Evaluation
  - Livestock – Nutritional requirements
  - Acres – Forage availability, Soil fertility
- Management
- Return on Investment
  - "Will fertilizing make me $$$"

It Depends

- Urea 46-0-0 @ $462/ton ($0.50/unit N)
- 40lbs N/acre (40 * $0.50- $20/acre)
- (Yield goal) x (40lbs N/Ton)
- 1lb N = 50lbs of forage
- With one pound of nitrogen costing $0.50 and it producing 50 pounds of forage, the cost of fertilizer in a pound of additional forage is $.01 ($.50 ÷ 50 lbs) or $20 per ton.

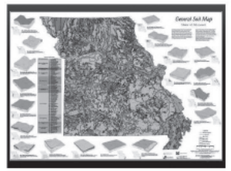
1

DO I NEED TO FERTILIZE?

- What are the alternatives to obtain forage if the decision is made not to fertilize?
- $20/ton of forage
  - Rent pasture
  - Buy hay
  - Alternate forage – annuals
- Will your forage stand allow you to get the production you need from the soil fertility that is present?

Toolbox

- Soil Test
  - Get a useful sample
  - Understanding the soil test report
- Limiting factor
- Fertilizer math
- pH and lime
- Hay vs. pasture – Nutrient removal
- Legumes



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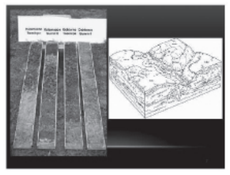
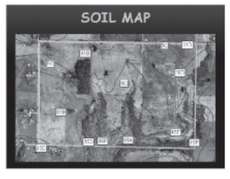
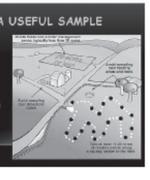


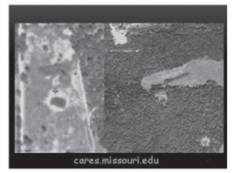
SOIL MAP

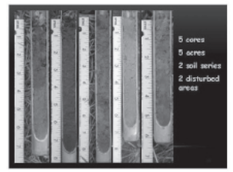


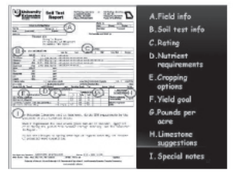
GET A USEFUL SAMPLE

- 15 - 20 Cores
- Soil Probe
- Right Depth
- Clean Bucket
- Pastures 2-3 yrs
- Hay Fields 1 yr
- Same time









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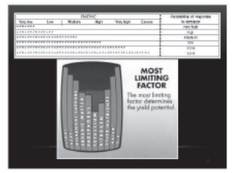

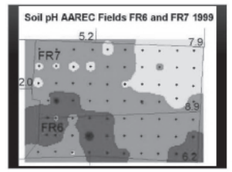

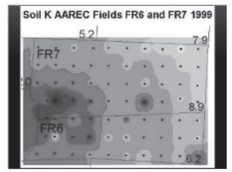

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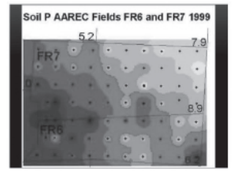

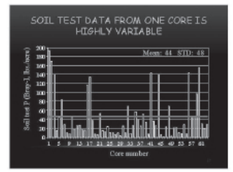

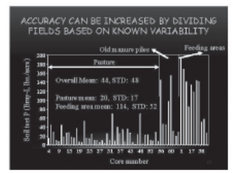

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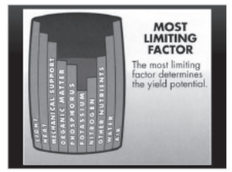

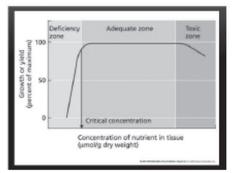

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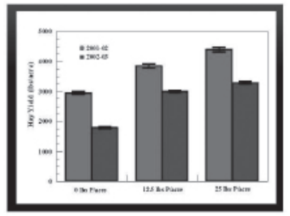

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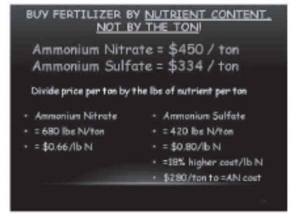

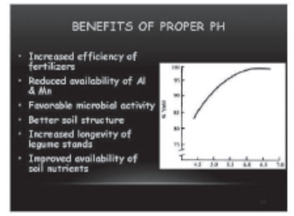

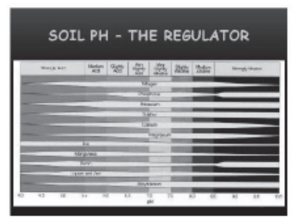

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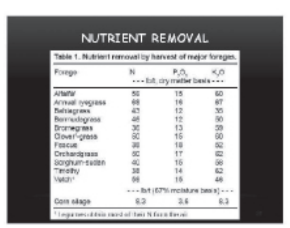

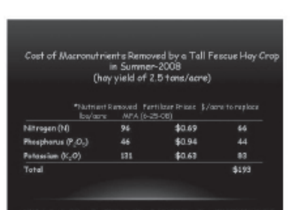

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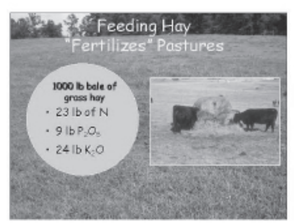

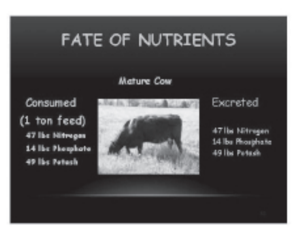

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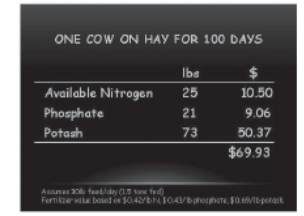

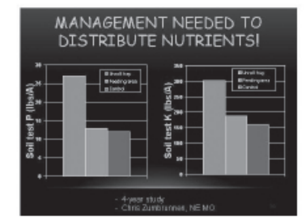

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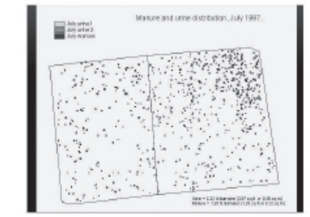

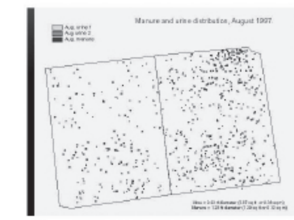

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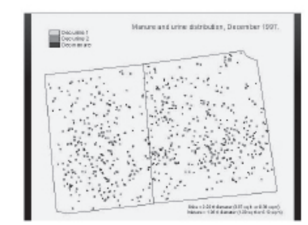

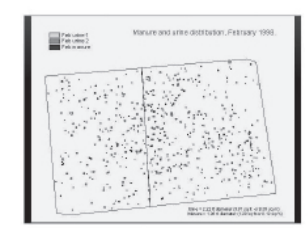

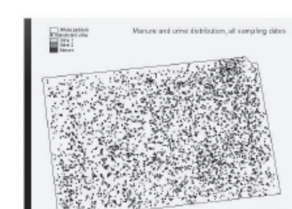

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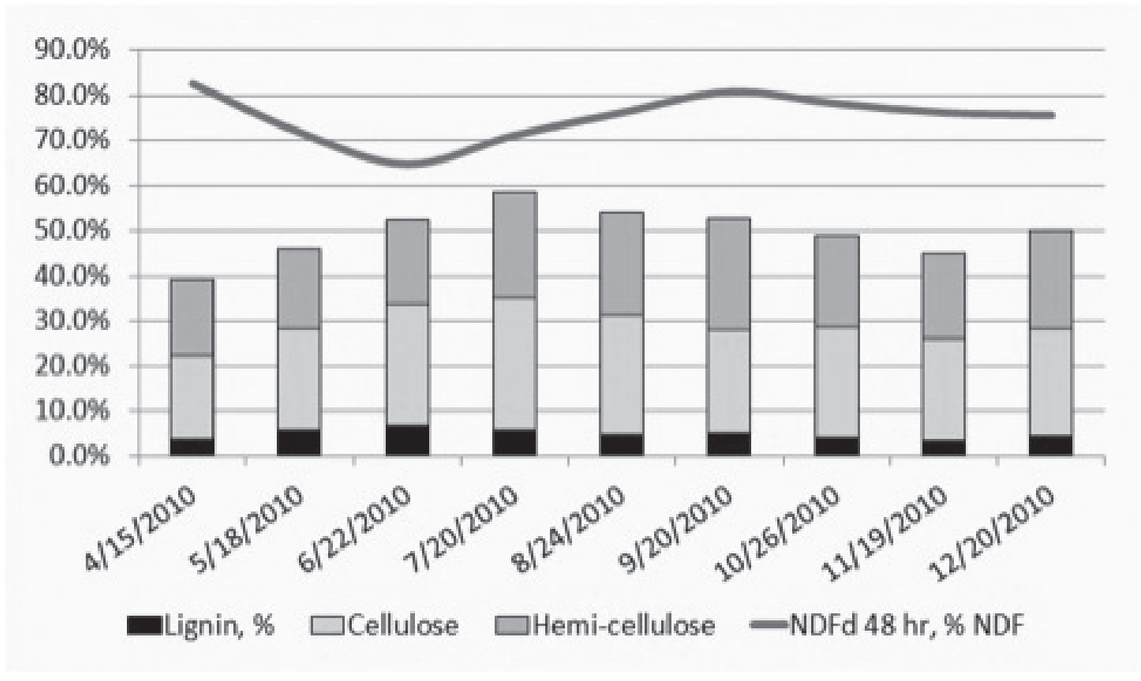
Minimizing Hay Feeding and Storage Losses

Justin Sexten
State Extension Specialist – Beef Nutrition
sextenj@missouri.edu

Hay feeding and storage losses are significant contributors to feed costs. To put waste costs in perspective simply divide the cost of a bale or ton of forage by the percent remaining following storage and feeding. For example, $50 / ton hay becomes $63 / ton hay if 20% is wasted through storage and feeding combined. As the remainder of this article will discuss 20% total losses are not uncommon using common storage and feeding methods.

Minimizing storage and feeding losses starts with making quality forage. Quality forage production begins with harvest timing. As forages mature digestibility declines. An illustration of forage quality and digestibility is indicated in Figure 1. These data were collected on producer farms in cooperation with a Sustainable Agriculture Research and Education (SARE) grant. As forages mature throughout the season the percentage of forage fiber increases as shown in the bar components of the graph. The line depicts the digestibility of fiber components relative to season. Producers who delay forage harvest into June and July harvest the maximum amount of fiber with minimum digestibility. Increased fiber combined with reduced digestibility result in greater forage waste as manure passing through the animal.

Figure 1. Forage quality and digestibility over time



In addition to reduced forage quality, delayed haying reduces the hay field's availability for another cutting or mid-season grazing. Haying early in the growing season provides forage greater opportunity to re-grow thus increased grazing or late season haying opportunities and reduced forage waste. Earlier harvest moves the forage regrowth period into a potentially cooler and wetter period of the year rather than hot and dry summer conditions. Reduced forage regrowth can be considered another form of waste.

Minimizing storage losses begins with the baler and bale size. Smaller bales result in greater DM losses (Lechtenberg et al., 1974). Producers should produce the largest bale possible to minimize weather exposure. As bale size increases the percentage of bale exposed to weathering decreases. Differences in percent of bale exposed to weathering and bale size are shown in Table 1.

Table 1. Percent of bale volume affected relative to bale size

Bale Size, feet		Depth of Weathering, inches			
Diameter	Width	2	4	6	8
		Percent of bale volume weathered			
4	4	16	31	44	56
5	4	13	25	36	46
6	5	11	21	31	40

(Collins et al., 1997)

Select a baler capable of making tight cored bales to concentrate hay in the bale center where weathering is least likely to occur. High-density or tight bales have reduced dry matter losses and greater un-weathered dry matter recovery than low-density bales (Russell et al., 1990). Tight bales are less likely to sag and will minimize ground contact and associated wicking.

How bales are tied or wrapped is another consideration in minimizing storage losses. When selecting a method to tie bales storage losses and field efficiency should be considered. Net or plastic wrapping bales increases field efficiency due to minimum time required to wrap bales and resume baling. Twine tying takes longer to complete before resuming baling reducing the number of bales per hour, increasing fuel use and potentially increasing odds of rain damage.

Net wrapping has reduced dry matter loss, increase digestibility and increased un-weathered dry matter recovery compared to sisal twine tied bales (Russell et al., 1990). When stored outside bales tied with solid plastic wrap had the lowest DM losses (3.9%) compared to net wrapped (10.6%) and sisal twine tied (18.2%) bales (Collins et al., 1995). Harrigan and Rotz (1994) reported no differences in DM loss between net wrapped and sisal twine tied bales.

When storing twine tied bales outside consider using plastic rather than sisal twine. Significant forage losses are observed in roadways and ditches when sisal twine bales are moved after outdoor storage if twine and bale bottoms are rotten due to ground contact.

Ideally hay is stored inside a barn to prevent weathering and DM losses. If hay storage barns are not available then setting up the bale yard correctly can influence the amount of hay nutrients preserved or lost over the storage period. Plan to store hay on an elevated location preferably a south facing slope. The southern slope allows water to run away from the hay when the bales rows are oriented north and south. Bales oriented north and south will get maximum sun exposure as the sun passes over the hay during the day. Additionally place flat ends of bales next to each other to minimize exposure to rain. Store hay in rows a minimum of 3 foot apart to prevent water from running off one bale into the side of another. Leaving space between bales also allows air movement around bales to enhance drying (Ball et al., 1998)

In addition to a well-drained site consider adding a rock base to hay storage areas. Storing bales on pallets, tires or telephone poles will improve drainage and can reduce storage and feeding DM losses (Baxter et al., 1986) but can be troublesome to implement placing and removing bales. A rock base allows water to drain away from hay and reduces moisture wicking opportunities. An additional benefit of rock base is reducing the likelihood of getting stuck while retrieving hay.

Storing hay in a waterway or under a tree line are two locations where losses can be high in outside stored forage. Hay stored in waterways is subject to water flowing through the bottom of bales and washing nutrients to neighbor's property. Hay stored under a tree line along a fence row is not exposed to the sun and may be subject to minimal air movement resulting in increased dry matter losses due to waste.

Storing hay under tarps will also reduce forage nutrient losses. When used in combination with a gravel base hay tarps can be comparable to barns in terms of storage efficiency (Baxter et al., 1986; Belyea et al., 1985). As hay, fuel and fertilizer costs increase the opportunity to recover facility and infrastructure costs needed to reduce stored forage losses will also increase.

Hay feeding losses are a product of harvest, storage and feeding systems. Minimizing hay feeding system loss is best accomplished by feeding cattle based on nutrient requirements and hay quality analysis. In reality few producers limit feed cattle due to time and equipment limitations. When cattle are given ad libitum access to hay, feeder and feeding method can influence hay waste.

Solid skirted ring and ring feeders with cone inserts reduced hay waste by greater than 45% compared to trailer and cradle style feeders (Buskirk et al., 2003). While not noted in this experiment this difference may be in part to behavioral differences, as the trailer and cradle style feeders require cattle to consume forage higher off the ground than ring style feeders.

Hay DM intake was reduced by 10.2% with hay fed ad libitum using ring feeders and cone inserts compared to daily feeding using a hay processor or by rolling out with a tractor. Processing resulted in greatest hay DM intake (Landblom et al., 2007). Processing hay increases DM intake due to reduction in hay particle size and animal sorting capabilities. In both rolled out and processed hay producers were responsible for determining hay offered to cattle whereas cattle determined hay consumed in cone feeder treatment.

When ring feeders and ring feeders with cones are placed in a common feeding area cattle prefer to consume hay from ring feeders and will consume more forage from ring feeders without cone inserts (Dave Davis, personnel communication).

Limiting hay access time can reduced hay disappearance in replacement heifers (Sexten and Davis, 2010) and gestating and lactating cows (Cunningham et al., 2005; Miller et al., 2007). Limiting hay access time requires more labor but minimal machinery inputs. Producers trying to reduce waste using limited hay access time must offer hay with adequate quality to meet cattle nutrient requirements. Use of poor quality hay when access is limited and forage intake is reduced may reduce performance.

Reducing hay storage and feeding losses takes a systematic approach starting with correct harvest timing. After harvest hay quality can only deteriorate with storage. Producers should focus efforts to develop bale storage areas were bale ground contact is minimized and hay can be covered. Feeding systems should focus on limiting cattle's opportunities to waste forage by trampling.

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Save the Date!

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12th Annual Heart of America Grazing Conference

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University Plaza Hotel, Springfield, MO

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