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

On behalf of the program committee, I want to thank Mr. Dave Maples and all the fine folks at KCA for their support, assistance and encouragement. In addition, I want to thank the Kentucky Forage and Grassland Council for their continued support of Forages in Kentucky. My thanks to Clayton Geralds, Bill Payne, Jason Tower, Chris Pantle, and Russell Hackley for their presentations and papers for the proceedings.

Special THANKS are extended to Mrs. Christi Forsythe for her extra effort in program planning and in preparing and editing the proceedings.

Let me close by extending a special invitation to attend the 35th Kentucky Alfalfa Conference at the Cave City Convention Center in Cave City on February 26th. For more information on forages and forage-related events, see our website at http://www.uky.edu/Ag/Forage

Garry D. Lacefield
Program Chairman
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My Top 5 Forage Improvements/Practices
Commercial Hay

Clayton Gerals
Hay Producer

Clayton Gerals runs a commercial hay farm in Hart County near Munfordville, Kentucky. His total farm size is 630 acres, 350 of which are leased. The focus of his operation is producing small square bales for the horse market. Clayton currently grows a range of forage species including 500 acres of alfalfa and alfalfa/orchard grass and 130 acres of timothy and orchard grass. On average he puts up 100,000 small square bales a year.

My Top 5 Forage Improvements/Practices include:

1. Customers
2. Recordkeeping
3. Equipment
4. Technology
5. Family
My Top 5 Forage Improvements/Practices
A Dairy Take

Bill Payne
Dairy Producer

1. **Corn Silage**: Lactating Dairy Cows are the *metabolic athletes* of the livestock world. Few other creatures (a possible exception might be finishing steers) require the same levels of nutrition. Energy is frequently the limiting factor for these cows who are producing milk at a rate, in many cases approaching 30,000 pounds per lactation. At the same time, they are being asked to regain the weight they may have lost after calving and to rebreed so that they can repeat the process on a twelve month cycle.

   Corn silage is perhaps the most frequently used forage that can provide this energy. In addition to fairly high levels of energy, corn silage has digestible fiber, so necessary to proper rumen function. Per acre yields for energy are high which make corn silage an attractive choice on an economic basis.

2. **Alfalfa Hay and Haylage**: Lactating cows also require relatively high levels of protein in their rations. Alfalfa can provide this protein while not compromising energy levels. Alfalfa can also contribute very necessary fiber to a ration. Long stemmed alfalfa hay is particularly useful in that it can provide the “scratch factor” -- stimulating the production of saliva which serves to buffer the rumen. It is this buffering process which can help prevent the subclinical acidosis which can cause lameness.

3. **Cow Comfort**: High levels of production for any livestock require adequate comfort. This means time to lie and to ruminate in a relaxed condition. The extremely high levels of energy found in the ration of lactating cows usually require a relatively high level of starch. The rumen bacteria required to digest this starch produce higher levels of acid than optimal. The result, in too many cases, is subclinical acidosis. This can create sole abscesses in feet and lameness. Lame cows are not likely to eat as much as necessary to maintain their production and body condition, nor are they likely to cycle or to display signs of heat.

   To ensure cow comfort and to extend the useful lifetime of these cows, managers need to ensure that rations do not include high levels of starch. Other measures that can prevent lameness could be limiting time spent on concrete.

   One solution to enhancing cow comfort and to extend the cows’ careers would be to allow them to graze as much as possible. This would accomplish both of these
objectives by providing a ration low in starch and allowing the cows to spend more
time on dirt and less time on concrete. Cows on pasture tend to wear hooves in a
more natural manner and require little of no hoof trimming. They express signs of
heat and get bred back more quickly. In short, while their production levels might
not quite reach the 30,000 pound per lactation level, their lifetimes can be much
longer than those conventionally managed. In the dairy business, longer lifetimes
can mean higher profitability.

4. **Electric/High Tensile Fencing:** Without fencing, the cows are in charge. If we
want to be in charge, reliable fencing is necessary. Due in great measure to our
friends in New Zealand, electric high tensile fencing technology is available. This
fencing is relatively inexpensive, easy to install and long lasting. Low impedance
energizers make fence charging a pretty reliable proposition. Class III
galvanization on the high tensile wire means that wire can last far longer than
older wire would. By charging a fence, fewer wires are necessary and those wires
do not have to be as tight as would otherwise be needed. High tensile wire has a
“memory,” meaning that if deflected, it will return to its original length. This
property is especially valuable in wooded areas. High tensile woven wire fences
are also available and feature those properties mentioned above. Temporary
fences utilizing polywire and fiberglass or plastic posts are easy to install and
make rotational grazing practical.

5. **Stockpiled Fescue:** Fescue is at its best, especially in quality in the months of
November, December and January. By deferring grazing from August, September
and October until later grazing can be had in those months when little standing
forage is usually found. While standing fescue may not be quite the quality to
provide the sole forage for lactating cows, it can be a part of that ration. Further,
stockpiled fescue can be the sole forage for dry cows, and growing heifers in
deficit months.
My Top 5 Forage Improvements/Practices
Goats and Sheep

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The Southern Indiana Purdue Agricultural Center (SIPAC) is one of the eight Purdue Agricultural Centers located around the state of Indiana. Our focus on the 1320 acres at SIPAC is on forages, livestock and forestry. We graze a beef cow herd (185 head) of fall calving commercial cows, maintain a commercial meat goat herd (100 head) that kid out in May, develop 100 spring born beef heifers for the Feldun Purdue Ag Center as well as background their steers for 60 days at weaning, and we develop dairy heifers (150 head of 300 pounders) for 5 months a year. The acreage is about evenly split between forested acres and pasture ground. Our forestry focus is on raising top quality hardwoods and in the last several years focusing on invasive species control and oak regeneration.

SIPAC’s top 5 forage and management tips for Goats:

1. Some sort of managed grazing
2. FEMACHA
3. Planted summer and winter forage crops
4. Browse
5. Quality fencing materials

Managed Grazing

Rotational grazing, intensive grazing, Management intensive Grazing (MiG), mob grazing, high stock density grazing, ultra-high stock density grazing, it does not really matter what it is called, but used properly each of these can be great management tools for both animals and forages. It is important to understand that one style does not fit all situations and they should all be considered for use depending on the situation and
environmental conditions. From a forage stand point when properly utilized, these management styles can help prevent overgrazing, allow for a longer recovery periods, help to increase soil organic matter, possible higher annual forage yields, and offer the potential for higher quality forages. When studying these programs from the animal's perspective the potential exists for higher animal performance and decreased parasite loads perhaps leading to improved animal health.

FEMACHA

Parasites are a major management issue when raising goats (and most small ruminants). The majority of deaths in the SIPAC goat herd are due to parasite load. To make matters worse the SIPAC herd like many (it could be most) herds have parasite populations that are resistant to all the different classes of chemical dewormers that are on the market today. This has occurred over time due to miss dosing, goat metabolism and over use of the products. The majority of the parasite shedding comes from a smaller population with-in each herd. Therefore treating every animal at each treatment time is not necessary. The FEMACHA program, developed in South Africa, is a way of using the color of the lower eyelid (looking for anemia) to only treat the goats (or sheep) that are showing a parasite load. This method is really only targeting one parasite specie the barber pole worm (*Haemonchus contortus*) however, that is the major killing parasite during the forage growing season. Through use of FEMACA and record keeping it is possible to pick out those goats that are shedding most of the parasites and then those animals can be culled from the herd.

Planted Summer and Winter Annuals

Annual crops are a great way to have a high quality forage growing at time when maybe the cool and/or warm season perineal forages are slowing in growth or quality. SIPAC has used sorghum sudan grass and pearl millet in the middle of the summer for alternative forages and grown turnips, spring oats and annual rye grass in the fall and winter. All of these crops have the potential to be very high yielding and produce a high quality forage for the livestock. An added benefit to using these crops, especially with small ruminants, is that they can help with parasite management. Often times, it will have been several months between grazing these areas for the first time which helps to break the parasite life cycle as they can only live so long outside the host animal. When animals are grazing these crops (particularly the summer annuals) they are grazing at eye ball level and not at ground level. This is important as the larvae are not able to move up that high on the plant so a browsing animal is less likely to ingest the larvae and get re-infected.
Browse

By design, goats are natural browsers and not grazers. Browsers want to eat at eyeball level and up and grazers prefer to graze head down between their feet. Having browse available can be a high quality forage to help with animal performance but can also help to break the parasite cycle by allowing the goats to graze in another area during high parasite load times and grazing (actually they would be browsing) higher above the ground. Browse at SIPAC can be anything from spiny amaranth, pig weeds, cocklebur and iron weed that grow well in our winter feeding and feedlot areas to invasive species (multiflora rose, bush honeysuckle, and autumn olive) that are starting to invade the understory of our woods. All of these “weeds” can be a high quality forage crop for the goat herd that they will readily choose to eat before a quality grass legume pasture if given the choice.

Quality fence materials

Many of the things we do with goats at SIPAC could not be done without the use of quality fencing materials. Our exterior fencing is mostly high tensile 12.5 guage wire with 4” spacing for the first 18 inches or so as well as being energized. We also use some woven wire that is 4” x 4” squares that prevents the goats getting their heads stuck through the wire. For interior fences we use exclusively temporary fence. At SIPAC, this may either be electo-netting from Premier Fencing or a 4 wire poly wire product called Smart Fence from Gallagher. There may be other companies that have similar products available. We use a large low impedance 110 volt energizer in most places but also have solar panels and a 12 volt energizer system for use in browse or isolated areas. It is important to have a good ground system and that the fence stays hot all the time (greater than 4000 volts). When building a goat fence, keep the following advice we received in mind “Build the fence you think will hold a goat and then throw a bucket of water at it, if water gets through so will a goat!” The point is use quality materials and know it takes a more substantial fence to keep goats contained than it does cattle.
My name is Chris Pantle and I own and operate a Cow Calf operation in Owensboro, KY. We run approximately 150 mother cows consisting of purebred Angus and Angus-cross commercial cows. We calve in both the spring and fall. We utilize Angus bulls which we select based on pedigree and performance data.

Since taking over the operation in the early 90's we’ve worked steadily to improve our pastures and forage on roughly 225+ acres.

Our top 5 forage improvements have been:

- Strong focus on Alfalfa production
- Pay close attention to soil conditions and fertilize as needed / prescribed
- Intensive / rotational grazing
- When and How we cut hay (Cut higher, utilize conditioning)
- Inter-seeding (Clover, Rye)
- Hay barn
My Top 5 Forage Improvements/Practices

Stocker

Russell Hackley
Producer

The top forage practices that work for me on my farm begin with the realization and acceptance that I’m in the grass business first and the cattle business second. I haven’t always embraced the value of this concept and neither have most cattle farmers. For example, how many farmers consider pasture production as their highest priority? How many of them even consider their pasture as a high priority crop, or even a crop? Consider the membership totals of KCA – nearly 10,000 members, while membership in the KY Forage and Grassland Council is less than 100. The single most unappreciated, undervalued, most taken-for-granted resource in Kentucky is forages. Why? Probably because they come so easily for us. Hence, we fail to more fully utilize that which comes too easily.

Better utilization is the second most beneficial forage practice that works for me. Better utilization is achieved with frequent rotations to a fresh salad bar through the use of poly-wire and a pressurized watering system which provides cool, clear, clean water within 600 feet of the cattle. Such improved utilization of pasture allows for better nutrient recycling through improved distribution. For example, it has been estimated that every square foot of such a managed paddock will receive at least one manure pile within two years. This explains why pasturing removes so little soil nutrients since most of that which is removed is shortly returned. In my personal experience, after many years of annually soil testing, I find that I rarely need to add fertilizer in paddocks without shade. This certainly results in saving me one of the bigger expenses…and the easiest dollar I’ve ever earned was the dollar that I saved. The biggest risk to improved utilization is the temptation to take more than we should. The hardest practice for me to follow in the past has been the recommendation to “talk half – leave half.”

The third practice that works for me is maintaining 30-40% legume stand in endophyte friendly fescue pastures. Of course this requires a reasonable level of fertility with proper pH levels. But the single most effective practice in maintaining an acceptable legume mixture comes from sowing clover seed somewhere on the farm almost every year. I also consult the latest variety test results from the University of KY before purchasing my seed. I plead guilty to being “tight,” but I am not cheap. I buy the best when it comes to seed. To do otherwise, to me, is being “pennywise and pound foolish” – and a lost pound today is serious money with today’s cattle prices.

The fourth forage practice which I’ve earned the right to advocate is – stay focused on pasture production the hay production will take care of itself. This notion is easily
understood for two obvious reasons. One, when you are focused on grazing every day possible, you are going to have fewer days when you feed hay, thus requiring less hay. Secondly, springtime growth in KY usually will force most grazers to make some hay to preserve the quality of the extra pasture available. For too long I was focused on hay production. Staying focused on pasture production and utilization has truly resulted in more fun and profit, and profit is fun.

My fifth and final practice has been adopting the attitude that “we never get too old to learn.” I decided years ago that I’d rather be green and growing than ripe and rotting. That’s why whenever there is a grazing conference or forage program, look around…I’m probably there. In the end, it’s not what we know that counts, it’s what we do. Knowing is not enough. It’s like a man who knows how to read but doesn’t…he is no better off than the one who can’t.
Top TEN Forage Improvements: The BIG Picture

Dr. Garry Lacefield
Extension Forage Specialist
University of Kentucky

This marks the 20th consecutive year we have done a Forage's at KCA Program and I find it hard to believe the past 20 years have passed so quickly. The opportunities for forages in Kentucky were indeed great twenty years ago; however, they are much greater now than when we started this Conference.

CHANGE

The only real constant in life is “change” and “change” is often more rapid than this conservative country boy can handle. Just think about the changes in medicine, lifestyles, culture, etc. and, of course, “technology”. I began my career with an overhead projector and never dreamed I would have cell phone, I-Pad, I-Phone6, I-Watch, computer, PowerPoint, website, e-mail, facebook, twitter and google. In fact, I grew up in a home, oldest of ten children, no telephone, without electricity, running water and indoor plumbing. Last year I flew over 50,000 miles and was in seven countries but remember as a child riding a horse to town and later we got a pickup so I rode in the back, rain or shine. I went in the military at 17 just out of high school and spent 30 months in Germany. While there I never made or received one phone call and only communicated with family and friends by letter. Last year I was in Germany and used my cell phone to call home/office each day and exchanged e-mail from my laptop in the hotel room at night.

In 2011, we reached a milestone in the World when the one billionth person was born. Population is expected to reach 10 billion by 2050. In addition, people are living longer with an increase in average life expectancy in the U.S. to 78.37 years. More people, living longer BUT eating less of the products we produce. Per capita consumption of beef in the U.S. reached a record low of 59 pounds last year. This is the lowest since the database started in 1955. Chicken on a per capita basis has shown dramatic increases passing pork in the mid-80’s and beef in the early 1990’s. In addition, we have fewer farms today than ever. Less than 1% of our population is currently considered fulltime and only 2% live on farms. We have seen a steady decline in the number of beef and dairy farms for over twenty years. Fewer farmers on fewer farms with fewer cows are still producing an abundant supply of wholesome meat, milk
and dairy products. Larger farms and more production per cow have helped to compensate for the reduced farm-farmer-animal base.

**CHALLENGES**

Kentucky farmers face more challenges today than ever. Time, space and knowledge does not permit me to address all but a few examples include rising production cost, animal rights-animal welfare, environmental issues, food-feed-fuel, health issues, governmental regulations, competition and weather. I remember my first car (1950 V-8 flathead Ford with overdrive) and could go to the gas station in McHenry, Kentucky and buy a gallon of gas for 23 cents and Mr. Phelps would pump the gas, wash my windshield, check the oil and air up any low tires. I never dreamed I would see gasoline go to $5.00/gal as I saw in California in 2012. Likewise, when I gathered the down row of corn with a wagon pulled by horses I never dreamed I would see corn reach $8.00, and soybeans $17.00. These factors and others have resulted in average U.S. farmland increasing drastically. In 2011, U.S. average farmland increased 6.8%, in the Midwest 16% and in Iowa 24%. USDA and University budgets have been reduced. In 2011, the USDA announced the closing of 259 facilities in the U.S. We have seen a 60% loss in forage-livestock researchers, 40% drop in forage-livestock teachers and the loss of extension specialist is approaching 50%.

**OPPORTUNITIES**

Forages in general and in particular grazing has played a critical role historically, interest and opportunities for grazing are the highest I have seen in my career; however, the most important role for forages and indeed grazing is the Future. **We CAN produce quality animal products with quality forages.** We will not have the luxury of substituting cheap energy and proteins for low quality forages. The good news is we don’t have too. Graziers today are recognizing the value of forage quality, factors affecting quality and management required to achieve an acceptable quality to meet desired animal performance results.

In 1989, Drs. Don Ball, Carl Hoveland and I put together ten key factors that were the foundation of the book “Southern Forages”. These concepts can play a critical role toward the ultimate goal of producing “Quality Forages” for environmental-sustainable-profitable forage-livestock programs.
KEYS TO FORAGE PROFITABILITY

Know Forage Options and Animal Nutritional Needs. Forages vary as to adaptation, growth, distribution, quality, yield, persistence, and potential uses. Also, various types and classes of animals have different nutritional needs. Good planting decisions require knowing forage options for the land resources and nutritional needs of the animals.

Establishment is Critical. Good forage production requires an adequate stand of plants. Mistakes during establishment often have long-term consequences. Use of high quality seed of proven varieties, timely planting, and attention to detail lead to establishment success.

Soil Test, then Lime and Fertilize as Needed. This practice, more than any other, affects the level and economic efficiency of forage production. Fertilizing and liming as needed help ensure good yields, improve forage quality, lengthen stand life, and reduce weed problems.

Use Legumes Whenever Feasible. Legumes offer important advantages including improved forage quality and biological nitrogen fixation, whether grown alone or with grasses. Every producer should regularly consider on a field-by-field basis whether the introduction of legumes would be beneficial and feasible. Once legumes have been established, proper management optimizes benefits.

Emphasize Forage Quality. High animal gains, milk production, and reproductive efficiency require adequate nutrition. Producing high quality forage requires knowing the factors that affect forage quality and managing accordingly. Matching forage quality to animal nutritional needs greatly increases efficiency.

Prevent or Minimize Pests and Plant-Related Disorders. Diseases, insects, nematodes, and weeds are thieves that lower yields, reduce forage quality and stand persistence, and/or steal water, nutrients, light, and space from forage plants. Variety selection, cultural practices, scouting, use of pesticides, and other management techniques can minimize pest problems. Knowledge of potential animal disorders caused by plants can reduce or avoid losses.

Strive to Improve Pasture Utilization. The quantity and quality of pasture growth vary over time. Periodic adjustments in stocking rate or use of cross fencing to vary the type or amount of available forage can greatly affect animal performance and pasture species composition. Knowing the advantages and disadvantages of different grazing methods allows use of various approaches as needed to reach objectives. Matching stocking rates with forage production is also extremely importance.

Minimize Stored Feed Requirements. Stored feed is one of the most expensive aspects of animal production, so lowering requirements reduces costs. Extending the grazing season with use of both cool season and warm season forages, stockpiling
forage, and grazing crop residues are examples of ways stored feed needs can be reduced.

**Reduce Storage and Feeding Losses.** Wasting hay, silage, or other stored feed is costly! On many farms the average storage loss for round bales of hay stored outside exceeds 30%, and feeding losses can easily be as high or higher. Minimizing waste with good management, forage testing, and ration formulation enhances feeding efficiency, animal performance, and profits.

**Results Require Investments.** In human endeavors, results are usually highly correlated with investments in terms of thought, time, effort, and a certain amount of money. In particular, the best and most profitable forage programs have had the most thought put into them. Top producers strive to continue to improve their operations.

**REFERENCES**
