

# FORAGES

# AT

# KCA

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***GARRY D. LACEFIELD AND CHRISTI FORSYTHE, EDITORS***

# FOREWORD

This marks the tenth consecutive year we have had a Forage Symposium to kick off 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 beef-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 Dr. David Ditsch and Mr. Jason Tower 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 our 25th Kentucky Alfalfa Conference to be held at the Cave City Convention Center, February 24, 2005.

Garry D. Lacefield  
Program Chairman

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# FORAGE QUALITY - Back to Basics

*Garry D. Lacefield*  
Extension Forage Specialist  
University of Kentucky

Forage quality means different things to different people. Forage quality varies tremendously among and within forage crops. Forage quality needs varies among and within animal species. Forage quality has been defined in terms of protein, fiber, lignin content, relative feed value, relative forage quality, color, smell, leafiness, fineness of stems, total digestible nutrients, and other physical and/or chemical components. All of these components have merit, but all fall short of clearly defining forage quality. Factors such as average daily gains, conception rates, milk production, wool production, etc. are reliable indicators of forage quality. Forage quality can be defined as: the extent to which a forage (pasture, hay, silage) has the ability to produce a desired animal response. With this working definition we realize that we must consider the animal. As an example, a high producing dairy cow needs a higher quality feed than a dry pregnant beef cow. A basic principle in efficient livestock production is to know forage quality and match that quality to animals needs.

## Factors Affecting Forage Quality

***Animal Considerations*** - The ultimate test of forage quality is animal performance. Quality can be considered satisfactory when animals give the desired level of performance. Factors which influence animal performance include: 1) Palatability - Will the animals eat it? In general, high quality forages are highly palatable and vice versa. Animal selection of one forage species over another depends on smell, touch and taste. Palatability may be affected by texture, leafiness, fertilization, dung and/or urine patches, moisture content, pest infestation, or compounds that cause a forage to be sweet, sour, or salty. 2) Intake - How much will they eat? Forage must be palatable if it is to be consumed in adequate quantities to meet animal needs. In general, the higher the quality, the more that will be consumed. 3) Digestibility - Of the forage consumed, how much will be digested? Once the forage is consumed, it must be digested to be converted to animal products. Digestibility (the portion of the forage consumed in passage through the alimentary tract) varies greatly, depending on the type of material consumed by the animal. Immature, leafy grasses may be 80 to 90 percent digested, while digestibility of mature stemmy material is often below 50 percent. 4) Nutrient content - Once digested, does the forage provide an adequate level of nutrients? Leafy growing forage plants usually contain 70 to 90 percent water. With this variation, it is best to express forage yield and nutrient content on a dry matter basis. The constituents of forages can be divided into two main categories: a) those present as cell contents or the non-structural part of the plant tissue (protein, sugar, and starch); and b) those which make up the structural components of the cell wall

(cellulose, hemicellulose, and lignin). High quality forages are high in protein, energy, vitamins and minerals and low in fiber and lignin. 5) Anti-quality factors - Depending on the plant species, time of year, environmental conditions, and animal sensitivity, various compounds can reduce animal performance, cause sickness, or ultimately death of the animal. Included in this group of compounds are: tannins, nitrates, alkaloids, cyanoglycosides, estrogens, mycotoxins, and other unidentified constituents. High quality forages must be free of anti-quality factors which are harmful to animals consuming it.

## **Plant Considerations**

Many factors affect quality of the forage crops we grow for pasture, hay, or silage including: species, varieties, fertility, pest damage, growing conditions, harvest and storage techniques, grazing management, plant age, stage of maturity, and climate and weather changes. Of the above factors, species and stage of maturity usually offer the greatest opportunity to improve forage quality the most.

***Plant Species*** - Considerable variation exists in quality among and within forage species. In general, legumes are higher in quality than grasses. Cool season grasses are generally more digestible than warm season grasses. Cool season annual grasses are usually more digestible than cool season perennial species at the same stage of maturity. Considerable variation also exists among varieties within species. Plant breeders have improved, and continue to improve forage quality within species.

***Stage of Maturity*** - Of all the factors affecting forage quality consumed as pasture, hay or silage, stage of maturity when harvested is the most important and the one in which greatest progress can be made. As legumes and grasses advance from the vegetative (leafy) to the reproductive (seed) stage, they become higher in fiber and lignin content and lower in protein content, digestibility, and acceptability to livestock. Grasses may have a protein content of over 30 percent when in an immature leafy stage but drop to less than 8 percent when mature. Digestibility drops with age in both grasses and legumes and may decline at rates of over 0.5 percent per day. Relative Feed Value in alfalfa can drop by five points per day as it advances from the bud stage. Over the past twenty years in Wisconsin, quality tested hay auctions each increase in Relative Feed Value was worth \$10.86 to the seller. The optimum stage for harvesting forage crops for hay or silage is always a compromise among yield, quality, and stand persistence. In general, the best compromise position for first harvest is when the plants are changing from the vegetative to reproductive stage. In grasses it represents the boot to early head stage; in legumes bud to early flower.

## **Summary**

Efficient livestock producers must produce high forage yields, but additional emphasis must be placed on quality. Producing high quality forage requires attention to

details from pre-establishment to post-harvest. It is not necessary to understand how forage quality is measured in a laboratory, but some understanding of how forage quality affects animal performance is important to efficient livestock production. We need to know the quality of feed available either as pasture, hay or silage and the nutritional needs of the animals we are feeding. Knowing this we can match feed based on quality to animal based on requirements. We need to realize the impact plant species and stage of maturity have on forage quality and animal performance. It is the total quantity of available nutrients in a given amount of forage, and not the total quantity of forage, that is of primary importance in obtaining good animal performance.

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# **CORN AS A GRAZING CROP: AN OPTION FOR EXTENDING THE GRAZING SEASON IN KENTUCKY**

*D.C. Ditsch, J.T. Johns, S.G. Isaacs, T.B. Mark, and C.D. Lee*  
University of Kentucky

## **Introduction**

Grazing is the cheapest way to feed cattle on a cost per pound of nutrient basis. However, producers with limited land resources in Kentucky have been able to use commodities or grain by-products to increase cattle numbers due to low cost and availability of these inputs. Extending the grazing season is one solution that would enable producers to reduce cost and expand production with little or no impact on the environment.

Corn is not a traditional grazing crop in Kentucky, but results from several on-farm trials in southeastern Kentucky suggest that grazing corn could be part of an extended grazing program. Significant increases in animal production per unit of land area from grazing standing mature corn during late fall/early winter are possible and economical. Grazing corn during late fall/early winter allows producers to take advantage of historically positive changes in market prices from fall to spring. For the cow-calf producer, reducing winter feed and labor costs are of major importance. Grazing standing corn with beef cattle could reduce dependence on hay, provide an opportunity for fall pastures to rest and accumulate and allow extended grazing into the early winter. November through March is typically a non-productive period for cool-season forage crops in Kentucky requiring the feeding of stored feeds. If cattle are used to harvest standing corn, there is no need for harvesting, storage and feeding of this high energy feed which should reduce equipment needs, fuel cost, capital investment and labor cost. Grazing can be managed with temporary fencing and properly placed watering systems. This system returns the manure to the land thus promoting nutrient cycling and minimizing potential impacts on ground and surface water. Soil erosion potential is greatly reduced with the plant residue cover that is maintained on the land.

## **Field Selection**

Selecting a good site is probably the first and most important step in establishing grazing corn. The following characteristics should be considered when selecting a field for grazing standing mature corn:

- 1) the need for renovation;
- 2) corn yield potential;
- 3) drainage characteristics
- 4) access to livestock water...

Planting corn in a pasture or hay field that needs to be renovated due to increasing weed pressure and/or the absence of preferable forage species is an excellent practice that breaks the cropping cycle and allows for a wider spectrum of herbicides to be used in preparation for future re-seeding of forage species. Producers not familiar with weed control options in corn production should carefully select herbicides that do not present a carryover risk to spring seeded forage grasses and legumes following winter corn grazing. Likewise, careful attention needs to be paid to the most appropriate herbicides for corn weed control. Poor selection of herbicides for optimum weed control and corn production can result in lower yields and increased weed pressure in subsequent years.

The economic feasibility of grazing corn is highly dependent on maximizing the number of grazing days per acre which is a function of dry matter and/or grain yield per acre. Attention to details such as corn hybrid selection, weed control, planting date, planting depth, and plant population are important for optimum yields.

Soils that are poorly drained or subject to a high water table should not be considered for late season grazing. Wet soil conditions are common during the winter months with temperatures often above freezing. Concentrated animal traffic during this period can result in soil compaction, increased soil erosion, lower corn utilization and a rough surface requiring tillage to correct. The best sites for late season corn grazing have good surface and internal drainage.

Access to good quality livestock water is an important feature when selecting fields for corn grazing. Portable systems work well for summer or fall grazing, but water systems protected from freezing are necessary for late winter grazing. Livestock access to ponds, creeks and streams should be avoided when possible.

## **Corn Hybrid Selection**

The economic feasibility of grazing corn is highly dependent on the number of grazing days per acre which is a function of dry matter and/or grain yield per acre. Attention to details such as corn hybrid selection, weed control, planting date, planting depth and plant population are all important regardless of whether the corn is to be grazed or harvested for grain.

Few seed corn companies evaluate and advertise their corn hybrids for livestock grazing and little information is currently available to help guide producers in making this decision. However, for mid-summer grazing, silage type hybrids appear to be the best

choice. For late winter grazing, hybrids that have high grain yield potential and good standability should be considered. According to field trials at the UK Robinson Station, not all corn hybrids stand well for winter grazing and protect the ear from weather loss (Table 1).

Corn hybrids that perform well in the Kentucky Hybrid Corn Test should be good candidates for grazing corn. The Kentucky Hybrid Corn Test ranks hybrids based on harvestable yield. For corn to rate high in yield, it must produce large ears, maintain those ears on the stalk and remain upright for mechanical harvest. These traits should lend themselves to grazing corn late in the year.

Hybrid	% Standing	<u>Grain Yield</u> bu.ac	<u>Population</u> plants/ac
NK83r7	97.2 a *	229.4 a	23,320 a
NX9188	93.9 a	207.1 a	21,690 abc
DK720s	92.4 a	147.3 b	18,330 bc
Pioneer 3527	87.9 ab	142.4 b	17,610 bc
Baldrige AmGraze	62.6 bc	98.4 c	17,510 c
Baldrige 38	55.9 c	135.8 b	22,050 ab
Baldrige 33	40.2 c	156.7 b	21,690 abc

\* Values within a column followed by the same letter are not significantly different at the 95% level of probability. Planting Date: 5-30-01 Harvest Date: 11-5-01

Selecting good hybrids is a major part to ensuring an adequate feed source for grazing. However, timely planting, proper plant population, proper fertilization, and early season weed control are all factors that need to be managed for successful corn grazing. Corn should be planted somewhere between April 1 and May 1 in western Kentucky, and between April 15 and May 15 in central and eastern Kentucky. Corn seeding rates should be targeted at final stands ranging from 22,000 to 30,000 plants per acre. Soil pH should be in the range of 6 to 7 for optimum nutrient availability. Weeds need to be managed early in the season to maximize corn growth. Weeds occurring in the field after the corn has reached physiological maturity (blacklayer) pose no threat to corn yields. For more information on corn production, consult ID-139: A Comprehensive Guide to Corn Management in Kentucky, which is available through your county extension office.

## Winter Grazing Efficiency

Results from on-farm trials in Pulaski and Laurel counties indicate that beef cows and stocker cattle continuous grazing standing mature corn can utilize approximately between 80 to 90% of the grain produced (Table 2). In 2001-2002, grazing efficiency (i.e. percent grain consumed) on farm # 4 was only 48% due to high rainfall and subsequent weathering loss of grain that remained in contact with moist soil during a 62 day winter grazing period. In contrast, the highest grazing efficiency measured during this study was 99% on farm #3 in 2002-2003 during a 91 day winter grazing period (Table 3). Unfortunately, the higher grazing efficiency resulted in a lower average daily gain (ADG) compared to the grazing efficiency of 48% (1.13 lbs and 2.22 lbs, respectively).

**Table 2. 2001-2002 Corn Grazing Project in Southeast Kentucky.**

Farm	Acres	Head	Stocking Density hd/ac	Grazing Days	Grazing Period	Grain Yield bu/ac	Grazing Efficiency %	ADG
1	5.5	82	14.9	43	10/30-12/13	148.3	89.7	1.77
1	11.8	73	6.2	47	9/7-10/25	44.8	73.4	2.47
2	12.4	64	5.2	68	11/30-2/5/02	107.5	93.7	1.66
3	10.5	25	2.4	89	11/18-2/15/02	89.1	85.4	1.95
4	8.9	45	5.0	62	11/24-1/26/02	51.3	48.1	2.22
<b>Mean</b>						82.9	78.1	2.0

**Table 3. 2002-2003 Corn Grazing Project in Southeast Kentucky.**

Farm	Acres	Head	Stocking Density hd/ac	Grazing Days	Grazing Period	Grain Yield bu/ac	Grazing Efficiency %	ADG
1	13.4	120	8.9	28	9/3-10/2	67.5	97.0	1.45
1	4.4	73	16.6	21	11/13-12/5	77.7	90.7	1.05
1	6.3	47	7.5	41	12/5-1/16/03	94.9	97.0	2.12
2	5.8	38	6.6	52	2/5-4/2/03	128.5	58.0	1.34
3	13.7	32	2.3	91	11/24-2/22/03	90.8	99.0	1.13
4	7.25	43	5.9	64	12/1-2/2/03	132.5	NA	2.13
<b>Mean</b>						82.3	88.3	1.49

In another on-farm trial in Laurel County, grazing efficiency and animal performance under continuous and strip-grazing were compared (Table 4). Stockers in the strip-grazing field were given access to 1 acre allotments of corn using one strand of electric fence and moved to a new strip at the discretion of the producer. Strips were layed-out so stockers could return to previously grazed strips for further grazing. Grain yield in the continuous grazed field was low due to high johnsongrass weed pressure.

Cattle could only be maintained on the strip and continuously grazed fields for 44 and 48 days, respectively. In general, grazing efficiency was higher with strip grazing compared to continuous grazing (89.7 and 73.7%, respectively). Strip grazing limits cattle access to the corn crop and requires a higher level of management to insure an adequate rate of intake for optimum animal performance. Continuous grazing requires less management but often results in less utilization of the corn crop due to a combination of animal traffic and weathering loss of grain. These results suggest that as grain utilization increases, individual animal intake decreases resulting in reduced animal performance. The decision to terminate corn grazing in a given field is based entirely on the producer's assessment of the amount of corn remaining and the rate of cattle intake. Therefore, the goal for managing the grazing period should not be to maximize utilization of grain. Based on these studies, a grazing efficiency of 80% should be the goal for grain utilization and best animal performance.

Grazing System	Strip	Continuous
Head	82	73
Acres	5.5	11.8
Stocking Density (hd/ac)	14.90	6.18
Grain Yield (bu/ac)	148.3 (total 815.7 bu)	44.8 (total 528.6 bu)
Days Grazed	44	48
Average Daily Gain (lbs)	1.77	2.42
Grazing Efficiency (%)	89.7	73.4

### **Economic Evaluation of Corn Grazing Studies 2001-2003**

The economic benefits of grazing standing corn crops with stocker beef cattle are quite variable. Determination of profitability depends greatly on assumptions concerning the methodology of expensing the home grown feed.

Economists and farmers often disagree on the method of determining the cost of home grown resources. The **economic cost** method would expense the resource at its opportunity cost, or the value the resource would have in its best alternative use. This opportunity cost would often be a market price minus any transactions costs associated with the sale of the resource. For pasture this might be the prevailing rental rate for pasture of similar quality. For harvested hay it might be the market price for the hay minus any transportation or handling costs. For the standing corn in this study, it might be the market price for grain minus the costs of harvest, storage, and transportation.

An alternative method of expensing the resource is at its **production cost**. For pasture or hay this might be the cost to seed, fertilize, maintain, harvest, and store the crop. For the corn in this study, it would be the cost of seed, fertilizer, chemicals, and

machinery to grow the crop. This cost of production method may be appropriate when the alternatives (or opportunities) to market the resource are limited.

In evaluating corn grazing, it is appropriate to use and compare both methods. Harvested corn is a commodity that generally has a well-defined and accessible market with an easily identified market price. Therefore, in most cases the opportunity cost, or **economic cost**, of corn can be readily determined. However, some farms could produce corn on steep land that could not be easily harvested mechanically. In some cases harvesting, storage, and transportation equipment may be limited. Therefore, the opportunities or intentions to market the corn might be limited, making a **cost of production** approach more appropriate.

Enterprise budgets were constructed from the production data in this study to determine the profitability of the grazing systems. Revenue was the out-weight of the stockers multiplied by the sale price for Kentucky feeder steers for the appropriate weight and date at the end of each study. Costs for this study were limited to variable operating costs. These costs included the purchase price of the stockers (again, based on the weight and beginning date of the study), veterinary and medicine costs (standardized at \$15.00 per head), feed and mineral costs, feeding labor, and an interest charge on the investment in the stocker. Net returns then are identified as a return over variable costs. No fixed cost charges for land, machinery, or management were assessed. The net return would be the residual payment to the fixed resources.

For purposes of this evaluation, budgets for both economic cost and cost of production were used and compared. The economic cost budgets charge the corn at its opportunity cost while the cost of production budgets charge the corn at the variable cost required to produce the crop. Economic cost is the local market price of the corn multiplied by the estimated yield per acre minus the cost of harvesting the corn. Market value of the corn was determined by multiplying the estimated grain yield of the plot times a market value of \$2.50 per bushel. Harvesting costs of \$22.00/ acre were subtracted from the market value to determine economic costs because in this case the livestock will harvest the crop. Costs of production per acre of corn were assumed to be \$125/acre for all the farms.

Net returns per head are presented in Table 5 for the 2001-02 grazing season, both on a cost of production and an economic cost basis. Net returns were variable with two farms receiving positive returns in each cost determination method. Net returns are significantly affected by market price for stockers. The price differential between purchase and sale price is often the most important determinant of profitability. Therefore, costs per pound of gain are also presented in Table 5. Cost of gain on a production cost basis suggests that corn grazing is a relatively economically efficient way to add value to stockers. Costs of gain ranged from 44 to 54 cents per pound in these studies when the corn was valued at its production cost. Costs generally were about 20 cents per pound higher when the corn was valued at its opportunity cost. The exception is Producer 1 CG study where very low corn yields (44.8 bu/ac) led to low opportunity costs per acre for the grazed corn.

**Table 5. 2001-02 Economic Evaluation**

	<b>Producer 3</b>	<b>Producer 2</b>	<b>Producer 1 SG*</b>	<b>Producer 1 CG**</b>
Acres Grazed	10.5	12.4	5.5	11.8
Animals Grazed	25	64	82	73
<b>Stocking Density (hd/ac)</b>	<b>2.38</b>	<b>5.16</b>	<b>14.90</b>	<b>6.18</b>
Total Gain (lb/head)	174	113	75	116
Days Grazed	89	67	43	49
<b>ADG</b>	<b>1.96</b>	<b>1.69</b>	<b>1.74</b>	<b>2.37</b>

**Cost of Production Basis (\$/hd)**

Revenue	\$514.64	\$490.23	\$553.50	\$649.44
Cost	\$477.05	\$484.22	\$569.40	\$654.93
Net return	\$37.58	\$6.02	(\$15.91)	(\$5.49)

**Economic Cost Basis (\$/hd)**

Revenue	\$514.64	\$490.23	\$553.50	\$649.44
Cost	\$508.96	\$507.73	\$584.41	\$649.27
Net return	\$5.68	(\$17.50)	(\$30.91)	\$0.17

**Cost of Gain (\$/lb)**

Cost of Production Basis	\$0.54	\$0.50	\$0.53	\$0.44
Economic Cost Basis	\$0.73	\$0.70	\$0.73	\$0.39

\*SG=Strip graze; \*\*CG=Continuous graze

**Table 6. 2002-03 Economic Evaluation**

	<b>Producer 3</b>	<b>Producer 4</b>	<b>Producer 2</b>	<b>Producer 1</b>	<b>Producer 1</b>
Acres Grazed	13.66	7.25	5.75	13.4	4.4
Animals Grazed	32	43	38	120	73
<b>Stocking Density (hd/ac)</b>	<b>2.34</b>	<b>5.89</b>	<b>6.55</b>	<b>8.95</b>	<b>16.59</b>
Total Gain (lb/head)	103	137	70	41	48
Days Grazed	91	64	52	28	42
<b>ADG</b>	<b>1.13</b>	<b>2.13</b>	<b>1.34</b>	<b>1.46</b>	<b>1.14</b>

**Cost of Production Basis (\$/hd)**

Revenue	\$ 395.57	\$ 529.83	\$ 382.98	\$472.13	\$475.04
Cost	\$ 446.21	\$ 444.81	\$ 424.69	\$498.10	\$489.85
Net return	(\$50.64)	\$85.02	(\$41.71)	(\$25.97)	(\$14.81)

**Economic Cost Basis (\$/hd)**

Revenue	\$ 395.57	\$ 529.83	\$ 382.98	\$472.13	\$475.04
Cost	\$ 479.93	\$ 475.70	\$ 450.91	\$500.41	\$492.64
Net return	(\$84.36)	\$54.13	(\$67.93)	(\$28.28)	(\$17.60)

**Cost of Gain (\$/lb)**

Cost of Production Basis	\$0.91	\$0.33	\$0.57	\$0.90	\$0.68
Economic Cost Basis	\$1.24	\$0.56	\$0.94	\$0.95	\$0.74

Only one farm was profitable on either cost determination basis (Table 6). The cost of gain values were more variable, ranging from 33 cents to 91 cents per pound on a cost of production basis. Economic cost of gain was uniformly higher than cost of production levels indicating the value of higher corn yields.

**SUMMARY**

On-farm trials in southeast Kentucky suggest that grazing beef cattle on standing mature corn may be a viable option for extending the grazing season. No significant impact on surface water quality was noted. During the two year study period reported, no herd health problems such as laminitis (founder) or grain overload were observed. Animal performance measured as average daily gain was highly variable ranging from 1.05 to 2.47 lbs. and appeared to be related to grazing efficiency and corn grain yield. Although the relationship between ADG and grazing efficiency in this study was weak ( $R^2=0.143$ , data not shown), it does suggest that managing grazing for maximum grain utilization may limit intake and result in lower cattle weight gain. Economic analysis

suggested that cost of gain was also highly variable ranging from 33 to 91 cents per pound.

Grazing days per head per acre were also highly variable in this study ranging from 211 to 637. This is most likely related to variable grain yield levels and the subjective management decision to terminate grazing in each field. More data will be necessary to evaluate the relationship between corn grain yield and grazing days per head per acre for predictive purposes.

Producers with limited grain crop production experience and potentially erodible land should pay close attention to no-till production details such as setting planters for optimum plant populations, seeding depth and weed control to improve their odds of economic success. More work is also needed to evaluate corn hybrids suitable for late season grazing. In addition to high grain yield potential, corn hybrids for late season grazing need to produce a strong stalk capable of standing and supporting the ear to reduce weathering loss. Farmers unfamiliar with corn production may choose to contract the production with a farmer who regularly grows corn.

Firm conclusions on the profitability of grazing corn are difficult to draw from these results. Clearly, the method of determining costs could lead to very different conclusions. For farms with corn harvesting and storage equipment and an accessible local market, these results would seem to suggest that selling the corn is the best option. On farms where the opportunity cost of the corn is low or approaches cost of production, grazing the corn seems to have merit. This is not a clear-cut economic decision. Yield potential, alternative markets for the corn, alternative uses for the land, and other factors may influence this decision

# IMPROVED PASTURE SYSTEMS MAKE SENSE ..... AND DOLLARS TOO!

*Jason Tower*

Superintendent

Southern Indiana Purdue Ag Center

Dubois, IN

812-678-4427

[jtower@fullnet.com](mailto:jtower@fullnet.com)

Talk to most any beef producer and he can tell you the facts of his beef operation. Many cattlemen can go back three or four generation on a cow's pedigree. He can tell you what bull was used on the farm for each of the last ten years. More than likely he can tell you the number of calves he weaned last year. He can tell you the average weight of those calves and if he topped the market, there is no doubt you will soon learn what price he received for the calves. Ask this cattleman what it cost to produce those calves and more than likely the response will be "My calves topped the sale last fall."

Heavy weaning weights and good prices at the sale barn are both good things to brag about at the coffee shop, but what did it cost to get them? Seven hundred pound weaning weights do not mean much if it cost \$600 to get there. A way to begin to understand these costs is to calculate an Annual Cow Cost (ACC) for the herd.

The simple definition of ACC is "What does it cost per year for the joy of owning this cow?" ACC will help producers to answer the question, "Is this cow paying for the privilege of grazing the grass or is she being paid to loaf around the farm?" ACC includes everything that goes into the cost of owning the cow: equipment, pasture expenses, mineral, winter feed, vet expenses, interest, vaccines, bulls, replacement costs, and land. Once all these are added up, hopefully, they amount to less than what the cow's calf was sold for. If this is the case then, there is some money left over to pay the producer for his labor and management skills.

Of all the parts of ACC, it has been documented time and time again that the winter-feed bill makes up the largest component. It is not uncommon for the producers to find out that winter-feed makes up 45-60% of cow ownership. Through grazing trails at the Southern Indiana Purdue Agricultural Center (SIPAC) it has been demonstrated how improving grazing management can in turn reduce ACC and sub sequentially increase cow profitability.

For the past five years a grazing trail has been run at SIPAC to evaluate two different grazing systems, one a 9-paddock system the other a 2-paddock grazing system. Stocking rates, acreages, and forage types in both systems were the same so conclusions could be made about each grazing system. In the five years of grazing, calf

weaning weights, cow condition, and pregnancy rates have not shown much advantage to one system over the other (See table 1) However, differences in the systems are showing up in the number of days cattle are able to graze each year. (See table 2) Over the five years the 9 paddock system has shown an average of 45-days or better advantage in grazing days. What this means is less days to haul feed to the cows resulting in a lower ACC.

In a separate cow winter feeding trial run at SIPAC the winter of 2001-2002 it was shown there could be a huge difference in what it costs to feed a cow in the winter. This trial showed a range of daily feed costs from \$1.07 to \$1.61 per cow. Compare this with a high of \$0.81 per day pasture cost (summer grazing) to keep the cow grazing. There is money to be made by saving it. Work out of the University of Missouri has shown that stockpiled tall fescue can be grazed for \$0.25/hd/day, corn stalks for \$0.05/hd/day and winter annuals for \$0.61/hd/day (forage costs). With some effort it can be quite easy to find other winter-feed sources than the hay bale.

What does all this feed cost talk mean to the profitability of the cow herd and improved grazing management? Over the five years of this grazing trial at SIPAC, there has been a \$43.50 advantage in net income in favor of the 9-paddock system. In the average 25-cow herd in Indiana, this comes to an extra \$1087.50 in the cattleman's pocket. The amazing thing is that it all relates back to the number of days we are able to keep that cow deriving her nutrient needs entirely from the pasture.

The question could be asked, "What would it take to make the 2-paddock system equal to the 9-paddock system in terms of net income?" There are two ways for this to happen:

1. Increase calf weaning weights
2. Increase calf selling price

To make up the \$43.50 difference in net income between the grazing systems the 2 paddock system would either have to gain an additional 47 pounds of calf weight or sell the current calf weight for an average of \$7.50 more a hundred. These requirements could be met but one has to be cautious of the additional costs to get there.

Although improving pasture-grazing systems does take time and some monetary investment, both investments are worth the effort in the end. Though managing the grasses, one finds what a great crop grass can be. With some thought given to caring for the forage in a pasture, a cattleman is rewarded with a crop that is very forgiving and productive. He can also be rewarded monetarily through reduced ACC and increased farm profitability.

	Traditional 2 paddock					MiG 9 paddock				
	2000	2001	2002	2003	2004	2000	2001	2002	2003	2004
Cow BCS	+0.48	+0.82	-0.25	-0.23	-0.19	+0.5	+1.0	-0.1	-0.69	-0.31
Calf WW	578	572	493	464	506	572	516	492	463	516
Preg. %	100	75	93.75	100	68.75	100	93.75	93.75	100	68.75

\* Starting in 2002 weaning occurred one month earlier and cows on trial were 1<sup>st</sup> and 2<sup>nd</sup> calf cows.

	2000	2001	2002	2003	2004
2 Paddock	170	134	165	187	231
9 Paddock	227	193	198	247	266
<b>Difference</b>	<b>57</b>	<b>59</b>	<b>33</b>	<b>60</b>	<b>35</b>

	9 Paddock	2 Paddock
2000	\$0.43	\$0.51
2001	\$0.81	\$1.10
2002	\$0.70	\$0.81
2003	\$0.50	\$0.69
2004	\$0.42	\$0.63

	9 Paddock			2 Paddock		
	ACC	Calf Sales	NET	ACC	Calf Sales	NET
2000	317.04	497.64	180.60	359.47	502.86	143.39
2001	393.99	412.80	18.81	456.36	486.20	29.84
2002	394.85	393.60	(1.25)	436.89	394.40	(42.49)
2003	317.95	463.00	145.05	397.97	464.00	66.03
2004	300.51	567.60	267.09	360.58	556.60	193.02
	<b>Ave.</b>	<b>122.06</b>		<b>Ave.</b>	<b>78.56</b>	