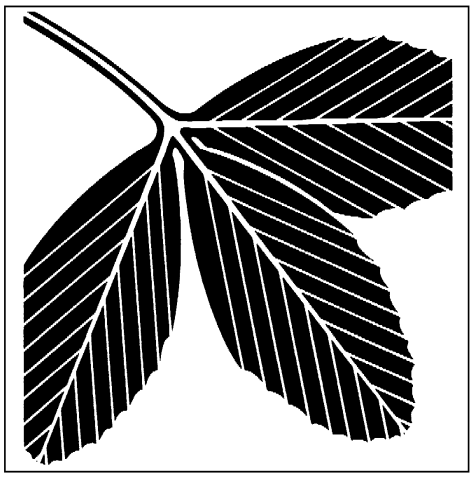


29TH KENTUCKY ALFALFA CONFERENCE PROCEEDINGS

Volume 29, Number 2
Garry Lacefield & Christi Forsythe, Editors

FEBRUARY 19, 2009

Cave City Convention Center
Cave City, Kentucky

Sponsored by
University of Kentucky● College of Agriculture● Cooperative Extension Service
Kentucky Forage and Grassland Council

Schedule for the Day

8:00 Registration, Visit Exhibits, Silent Auction

8:45 Welcome

9:00 Art and Science of Haymaking – Garry Lacefield

9:15 RFV vs RFQ – Which is better? – Tom Keene

9:30 Alfalfa Seed Price and Seeding Rate: Impact on Production Cost – Ray Smith

9:45 Alfalfa Hay for Horses: Myths vs. Reality – Laurie Lawrence

10:00 Break, Visit Exhibits, Silent Auction

10:30 Alfalfa as a Grazing Crop – Bill Payne

11:00 Keys to Success with Alfalfa Balage – Dennis Hancock

11:30 Roundup Ready Alfalfa and Future GMO's in Alfalfa – Dennis Gehler

12:00. Lunch

12:45 Alfalfa Awards Program and Silent Auction Results

1:00 Cost and Return of Alfalfa Hay Production – Kenny Burdine

1:45 How I Produce and Market Alfalfa Hay – Clayton Geralds

2:00 Blue Ribbon Alfalfa Panel – All Speakers

3:00 Adjourn

F O R E W O R D

This conference marks the twenty-ninth consecutive year we have come together to address problems and potentials of alfalfa. We are certainly encouraged with the interest in and opportunities for alfalfa in Kentucky. We are optimistic that we will observe expansion in acres, yield, and markets. It is our hope that the information presented herein and the discussions of the day will be of value to each of you in your alfalfa program.

On behalf of the Program Committee, I would like to express our thanks to each of you for your faithful participation over the past twenty-nine years. I also want to thank all speakers, moderators, committee members, and workers for their many contributions.

My personal thanks to the Program Committee, the Kentucky Forage and Grassland Council, and the Kentucky Department of Agriculture for their encouragement and assistance. I also want to thank all the exhibitors for their important contributions and financial support. A special thanks is extended to Mrs. Christi Forsythe for her assistance in preparing and editing the program and proceedings.

Garry Lacefield
Program Chairman
XXIX Annual Kentucky Alfalfa Conference

Mark your calendars and make plans now to attend our 30th Annual Kentucky Alfalfa Conference on February 25, 2010.

Visit our Extension Forage Website

http://www.uky.edu/Ag/Forage

KENTUCKY ALFALFA AWARDS

The Kentucky Alfalfa Awards Program was initiated in 2000 at the 20th Anniversary of the Kentucky Alfalfa Conference. The Awards Program is funded annually from revenues generated each year for the Silent Auction during the Annual Conference.

Year	Warren Thompson Industry Award	Charlie Schnitzler Producer Award	Garry D. Lacefield Public Service Award
2009	Ken Carpenter	John McCoy	Ray Smith
2008	Mike Phillips	Clayton Geralds	John Baylor
2007	Bret Winsett	Bill Payne	Dan Grigson
2006	Scott Cooper	George Eckler	Laurie Lawrence
2005	Barney Booher	Roy Reichenbach	Ken Johnson
2004	Gary Coughlin	Minos Cox	Mike Collins
2003	Phil Howell	Lee Robey	Monroe Rasnake Jimmy Henning
2002	Tom Keene	John Nowak	Billy Ray Smith
2001	Bill Talley	Larry Jeffries	Timothy H. Taylor W. C. Templeton, Jr.
2000	Warren Thompson	Sue Schnitzler*	Garry Lacefield

*Accepted on behalf of her father who was tragically killed in a farming accident on March 11, 1991.

TABLE OF CONTENTS

ART AND SCIENCE OF HAYMAKING

Garry D. Lacefield
Extension Forage Specialist
University of Kentucky

In 2007, Kentucky was chosen as one of three states to participate in the making of a movie on Quality Haymaking. Case IH Agriculture in an effort to better serve their customer base and the forage industry invested resources to produce, edit and distribute a DVD on Quality Haymaking. A national project coordinator was hired who in turn contracted with a film company. When we were contacted and learned it was not going to be a commercial for any one brand or product, we agreed to participate.

I, along with Texas A & M's Dr. David Bade and University of Idaho's Dr. Glenn Shewmaker were asked to comment on the "Science" side and nominate producers to address the "Art" side of haymaking. I nominated several top producers from Kentucky and Mr. John Nowak, from Christian County, was selected along with hay producers from Texas and Idaho. Filming occurred during 2007 and the DVD was released in spring 2008. The DVD has been released to Case IH distributors nationwide.

My thanks to Mr. John Nowak for taking time out of his "haymaking" schedule to participate in this project.

An now, "The Art & Science of Quality Hay".

RFV vs. RFQ – Which is Better

Tom Keene, University of Kentucky, Plant & Soil Science Department
Peter Jeranyama, South Dakota State University, Plant Science Department
Alvaro D. Garcia, South Dakota State University, Dairy Science Department

Determining the value of hay is often times a trying adventure but the rewards can be significant. It begs the question though, what do those numbers really tell me? Do they provide me pertinent information? There are so many numbers…which ones do I need to be concerned with? All of the numbers and information on the results sheets are important. However, certain numbers have greater bearing on some classes of livestock than others. As research continues to give us new parameters regarding, herd health, pounds of gain, pounds of milk, maintenance, etc. the importance of these will also likely change as well.

Feed quality of alfalfa harvested as haylage or hay depends, to a great extent, on the maturity of the stand. With increasing maturity, plant structural carbohydrates, as measured by the ADF and NDF fractions, increase. These fiber fractions represent the more indigestible parts of the plant. As a result, digestibility and energy obtained through fermentation decrease with maturity.

Relative feed value (RFV) has been used for years to compare the quality of legume and legume/grass hays and silages. Having one index to price hay and predict animal performance has been very useful for livestock producers and hay farmers.

Relative Feed Value (RFV)

The Relative Feed Value index estimates digestible dry matter (DDM) of the alfalfa from ADF, and calculates the DM intake potential (as a percent of body weight, BW) from NDF. The index is then calculated as DDM multiplied by dry matter intake (DMI as a % of BW) and divided by 1.29.

The index ranks forages relative to the digestible DMI of full bloom alfalfa, assuming 41% ADF and 53% NDF. The RFV index is 100 at this growth stage.

DDM = Digestible Dry Matter = 88.9 - (0.779 x % ADF)
DMI = Dry Matter Intake (% of BW) = 120 / (% NDF)
RFV = (DDM x DMI) / 1.29

where the numerator, **120**, in the DMI calculation indicates maximum feed intake in alfalfa-based dairy rations when NDF is 1.2 lb per 100 lb of body weight; the divisor, **1.29** in the RFV calculation was chosen so that the RFV of full bloom alfalfa has a value of 100.

Example: Alfalfa hay or haylage with 32% ADF and 40% NDF
(Plug in values for ADF and NDF on a dry matter basis)

DDM = 88.9 - (0.779 x 32) = 63.97
DMI = 120 / 40 = 3
RFV = (63.97 x 3) / 1.29 = 149

Relative Feed Value reflects both digestibility (from % ADF) and intake potential (from % NDF) of alfalfa.

Limitations of the RFV method include:

1. DDM and DMI are assumed constants for all forages.
2. ADF and NDF are the only laboratory values used in the calculation.
3. Crude protein concentration of forage is not used.
4. RFV cannot be used in ration formulation or evaluation.

Forage quality parameters including RFV ranking for each type of forage are in Table 1.

Higher RFV values indicate higher forage quality. Since the RFV system was developed using legume forages and intake responses of lactating dairy cows, it works best when applied to that situation.

Relative Forage Quality (RFQ)

Relative feed value is calculated by estimating the digestibility of the forage dry matter, and how much the cow can eat based on its “filling” capacity. However, cows sometimes perform differently even when fed forages of identical RFV. Variations in the digestibility of the NDF fraction can probably account for these differences.

Table 1. Forage quality values of some forages at different growth stages.				
Forage type	CP	ADF	NDF	RFV
	%			
Alfalfa-prebud	22	28	38	164
Alfalfa-bud	20	30	40	152
Alfalfa-early bloom	18	33	43	138
Alfalfa-full bloom	16	41	53	100
Alfalfa-seed pod	14	43	56	92
Alfalfa + grass	13	39	54	101
Bromegrass-late vegetative	10	35	63	91
Bromegrass-late bloom	7	49	81	58
Corn silage-well eared	10	28	48	133
Corn silage-few ears	8	30	83	115
Sorghum silage	8	32	52	114

Source: Dunham (1998)

Fiber from grass and legumes naturally differs in digestibility, as it also does when grown under different ambient temperatures. RFV of first-cutting alfalfa will be similar to that of second and third cuttings harvested at similar stages of maturity. However, fiber fraction digestibility from each cutting will be different, as this is influenced by ambient temperatures at the time of growth and development. Therefore, differences in fiber digestibility are not taken into account in the RFV calculation and cows may perform differently when fed forages from different cuttings.

Researchers at the University of Wisconsin have designed the relative forage quality (RFQ) index that uses fiber digestibility to estimate intake as well as the total digestible nutrients (energy) of the forage.

The RFQ index is an improvement over the RFV index for those that buy and sell forages, and it better reflects the performance that can be expected from cattle fed those forages.

One other advantage of the RFQ prediction is that it differentiates legumes from grasses.

The higher neutral detergent fiber in grasses will make RFQ a better predictor of quality than RFV. The RFQ emphasizes fiber digestibility while RFV uses digestible dry matter intake. Although grasses have higher fiber fractions (ADF and NDF), they also have lower lignin content (Table 2).

A comparison of data generated by the Olson Biochemistry Laboratory, SDSU shows that RFQ is slightly higher than RFV for the same sample. A relationship between RFV and RFQ has been derived from this limited data set and is presented in Figure 1.

The RFV generally penalizes grasses because of the higher fiber fraction compared with alfalfa. The RFQ credits grasses because the grass fiber tends to be more digestible than alfalfa fiber. Table 2 shows higher cell wall digestibility for timothy than alfalfa when incubated for 72 hr in rumen fluid-buffer solution.

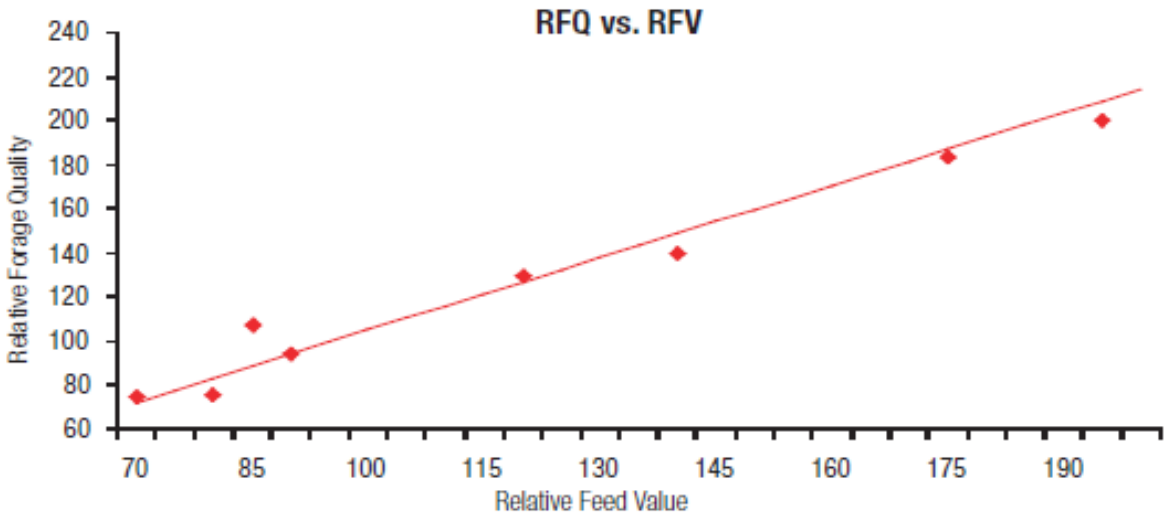
Table 2. Nutrient composition of selected forages.

Forage type	CP	NDF	ADF	Lignin	Cell wall digestibility*
	%				
Alfalfa	16	49	34	7	46
Corn silage	10	51	28	4	68
Timothy	10	66	34	4	57

* The % of NDF lost in 72 hr of incubation.

Source: Collins (1988)

Fig 1. Relative Forage Quality versus Relative Feed Value.



Relative Forage Quality Calculation

In the RFQ calculation total digestible nutrients (TDN) substitutes for DDM. Intake and TDN are calculated from fiber digestibility obtained in the laboratory.

For RFQ:

RFQ = (DMI, % of BW) * (TDN, % of DM) / 1.23

The value 1.23 ensures the equation has a mean and range similar to that of RFV.

Calculations to estimate TDN and DMI for alfalfa, clovers, and legume/grass mixes are as follows:

For TDN:

TDN = (NFC*.98) + (CP*.93) + (FA*.97*2.25) + (NDFn * (NDFD/100) – 7

Where: CP = crude protein (% of DM)
EE = ether extract (% of DM)
FA = fatty acids (% of DM) = ether extract - 1
NDF = neutral detergent fiber (% of DM)
NDFCP = neutral detergent fiber crude protein
NDFn = nitrogen free NDF = NDF – NDFCP, else estimated as NDFn = NDF*.93
NDFD = 48-hour in vitro NDF digestibility (% of NDF)
NFC = non fibrous carbohydrate (% of DM) = 100 – (NDFn + CP + EE + ash).

For DMI:

DMI = 120/NDF + (NDFD – 45) * .374 / 1350 * 100

Where: DMI is expressed as % of body weight (BW)

NDF as % of DM
NDFD as % of NDF
45 = average value for fiber digestibility of alfalfa and alfalfa/grass mixtures.

Conclusion

Relative feed value continues to be widely used as an index to assess quality, compare forage varieties, and price forages. However, differences in the digestibility of the fiber fraction can result in a difference in animal performance when forages with a similar RFV index are fed.

The RFQ index has been developed to overcome this difference. This index takes into consideration the differences in digestibility of the fiber fraction and can be used to more accurately predict animal performance and match animal needs (Table 3).

Although hay base prices vary with supply and demand, the market premium for quality is fairly constant. Long-term auction data indicate that the premium for quality

forage is worth $0.90/ton as RFQ changes from one value to another; therefore improving RFQ of harvested forage can improve profitability.

Table 3. Forage quality needs of cattle by relative forage quality.	
Relative Forage Quality	**Suggested Cattle Type**
100-200	Heifer, 18-24 mo Dry cow
115-130	Heifer, 12-18 mo Beef cow and calf
125-150	Dairy, last 200 days Heifer, 3-12 mo Stocker cattle
140-160	Dairy, 1st three months of lactation Dairy calf

Source: Undersander (2003)

References

Collins, M. 1988. Composition and fiber digestion in morphological components of alfalfa-timothy sward. Anim Feed Dci Tech 19:135-143.

Dunham, J.R. 1998. Relative feed value measures forage quality. Forage Facts# 41. KState AES and CES.

Undersander, D., and J.E. Moore. Relative forage quality. Focus on Forage, accessed at http://www.uwex.edu/ces/crops/uwforage/RFQvsRFV.htm#home

Undersander, D. 2003. The new Relative Forage Quality Index concept and use. World's Forage Superbowl Contest, UWEX.

ALFALFA SEED PRICE AND SEEDING RATE: IMPACT OF PRODUCTION COST

S. Ray Smith
Forage Extension Specialist
University of Kentucky

I am often asked the question about what is the ideal alfalfa seeding rate, especially with the price of seed for most improved varieties over $4.00 per pound. Before giving the ideal seeding rate or recommended range of seeding rates, let me overview alfalfa seed size, seedling survival, and plant survival. Alfalfa has about 200,000 seeds/lb. If one pound was evenly spread over one acre (43,560 ft^2), there would be about five seeds per square foot. Therefore if you take the seeding rate you are using and multiply by five, you will come pretty close to knowing how many seeds/ft^2 that you planted.

A 15 lb/acre seeding rate (Figure 1) equates to about 75 seeds/ft^2. Research suggests that only about 50 to 70% of those seeds will become seedlings after emergence is complete in three to four weeks. Using a 60% average, that leaves about 45 seedlings/ft^2. After emergence, then "survival of the fittest" determines which seedlings become established plants. On average, as plants grow in size and compete with each other, then another 40 to 50% will die by the next spring. That leaves about 25 plants/ft^2 going into the first full year of production. During the next year, approximately 30% die leaving about 16 plants/ft^2 and continuing with some plant loss each year after that. The important thing to remember is that as plant loss occurs over the life of the stand, the surviving plants grow larger and produce more stems.

At first glance it can be discouraging that a 15 lb/acre seeding rate or 75 seeds/ft^2 only results in 25 plants/ft^2 by the beginning of the first full production season, but the important thing is that the stand is productive and is thick enough to outcompete weeds. It seems intuitive that more seeds planted on an acre or per square foot should result in more seedlings and plants per square foot. Seeding studies suggest that higher seeding rates do result in more seedlings through the end of the seeding year. However, as seeding rates increase, the percentage of plants that die during the first year also increases. Research from a recent study by Marvin Hall and others from Pennsylvania and Missouri showed a 45% first-year plant loss for a 10 lb/acre seeding rate and a 60 to 70% for seeding rates over 20 lb/acre.

The Recommended Seed Rate

A range of studies throughout the Eastern and Midwestern U.S. have shown that plant densities and yield are nearly equal for seeding rates of 10 lb/acre or more in the

year following seeding (Table 1). But remember these are generally controlled studies on good land and seeding at rates higher than the minimal amount provide insurance against problems during establishment such at variable seeding depth, uneven emergence, weed pressure, seedling diseases. Also, remember that seed coatings reduce the actual number of seeds planted per acre. Since recommended seeding rates vary with region and check with your local extension office.

Research studies provide important baselines, but it usually makes sense to increase seeding rate over the recommended level from research studies. This takes into account seed coatings that add about 20 to 30% to the weight of the seed, situations where the seedbed is less than optimum or where the desired seeding depth is difficult to obtain (either too deep or too shallow), and factors like seedling diseases and potential insect damage. Also remember that when Roundup Ready® varieties become available they have about five percent of seed that are glyphosate susceptible. Given these considerations, in Kentucky we generally recommend a seeding rate of 20 lb/acre. Top producers that are confident of their land preparation and the accuracy of their seeding equipment can usually drop that seeding rate to 15 lb/acre. Interesting though, most top producers go with the 20 lb/acre seeding rate because the extra cost of seed spread over the life of a productive alfalfa stand is minimal. See the sections and figures below for the economics of seeding rate.

Table 1. Recommended seeding rates suggested by authors of several alfalfa seeding rate studies

State	Seeding Year	Seeding Rate Range	Recommended Seeding Rate
		Lbs./acre	
SD	1985	2-30	10-14
WI	1989	6-20	12-15
PA	1991-92	6-24	9
PA + MO	1995-98	3-25	<15

(from Rankin, 2008)

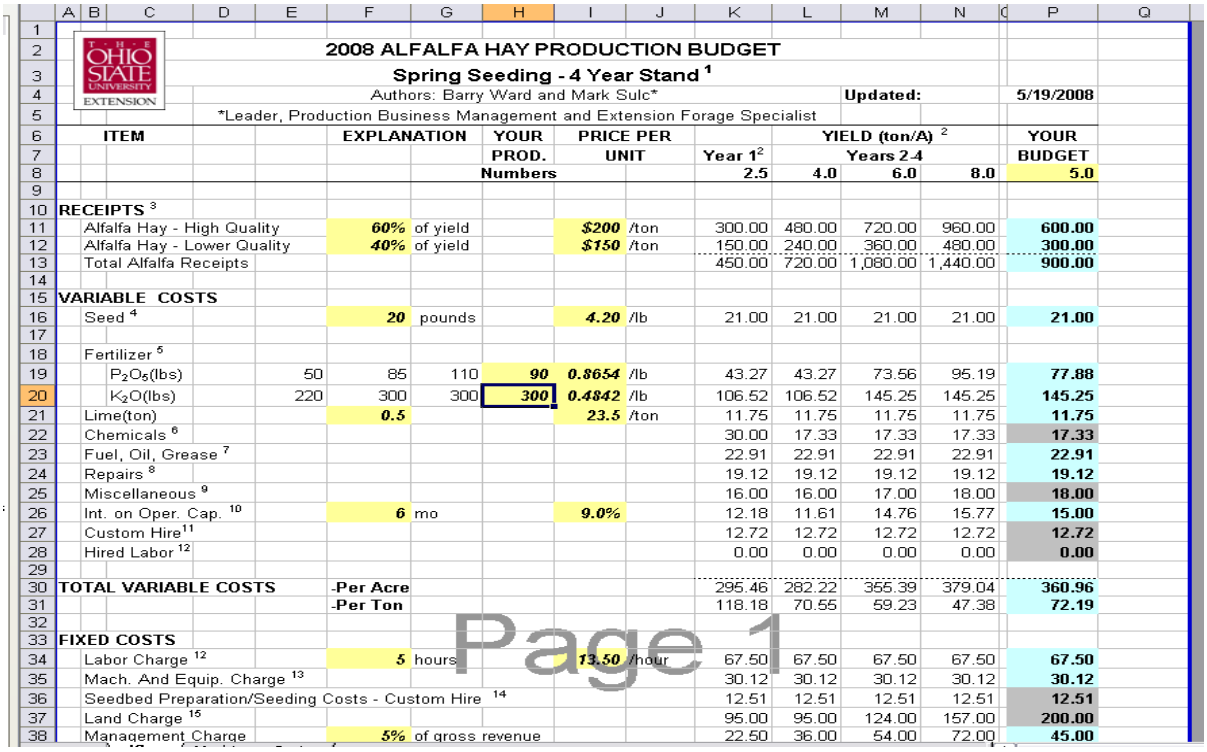
Because seeding equipment and planting conditions vary significantly, it might be well worth your time to track plant densities on your own farm. Count plants per square foot about a month after seeding, then in the fall of the seeding year, and again the next spring. At this point, you want to have at least 15 - 25 plants/ft^2 to achieve maximum yields. Even if plant counts are a bit lower, plants will likely compensate with more stems per plant. Excellent yields can still be attainable as long as weed pressure is minimized by spraying, clipping, or simply by maintaining a vigorous stand.

How Much Money Can I Save By Reducing Seeding Rates?

The important thing to remember is that seed costs, spread over the life of a stand, compromise only a small percentage of a total alfalfa production budget. I encourage you to do your own calculations regarding the cost of seed and the small difference it makes in the overall cost of a stand. There are a number of good alfalfa production budgets available from University Extension Specialists in the U.S. These budgets are typically excel spreadsheets so it is easy to enter your own production information. I have listed the names and websites of the budgets from The Ohio State and The University of Kentucky below.

Figures 1-3 show examples of the Ohio budget using seeding rates of 10, 15, and 20 lb/acre calculated with a $4.20/lb seed cost, a stand producing 5 tons/acre per year, and a four year stand life. Using this budget a 20 lb/acre rate costs $360.96/acre/year, 15 lb/acre costs $355.47/acre/year, and 10 lb/acre costs $349.99/acre/year. Therefore, saving a few dollars by lowering seeding rate from 20 lb/acre down to 10 lb/acre would save a grand total of $10.93/acre/year. Another way of looking at it is that going with the recommended 20 lb/acre only costs $2.19 per ton of hay over a 10 lb/acre seeding rate.

Figure 1. Alfalfa production cost with 20 lb/acre seeding rate The Ohio State alfalfa budget.



2008 ALFALFA HAY PRODUCTION BUDGET

Spring Seeding - 4 Year Stand [1]

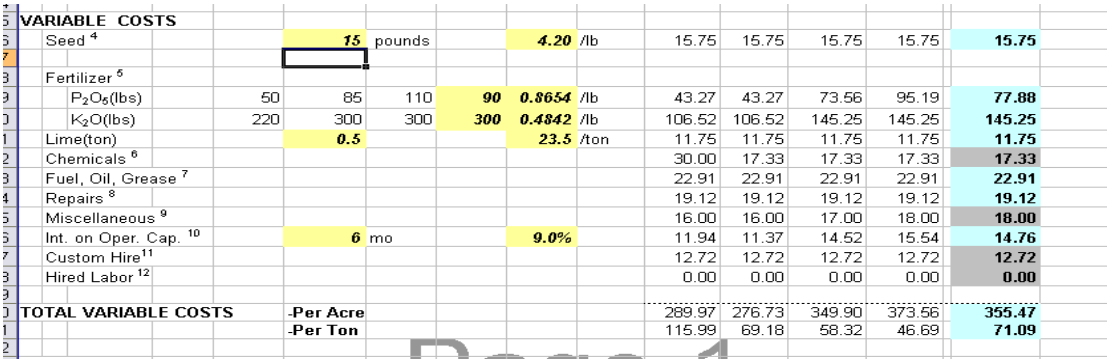
Authors: Barry Ward and Mark Sulc*

*Leader, Production Business Management and Extension Forage Specialist

Updated: 5/19/2008

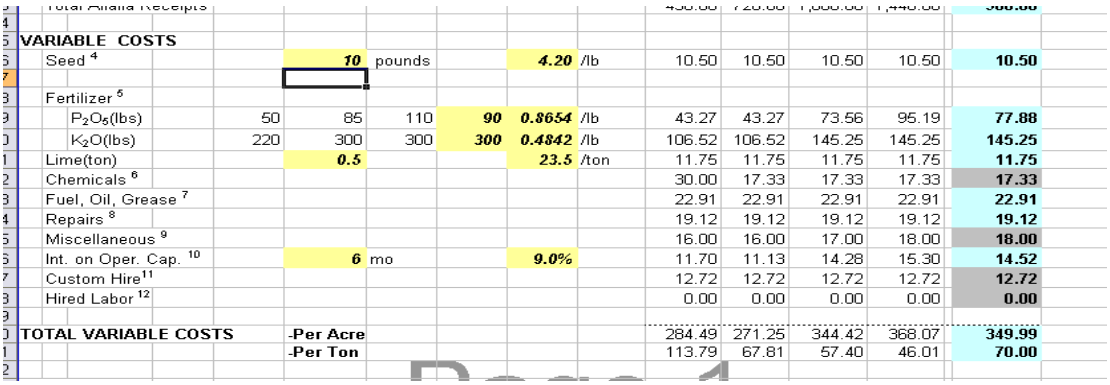
ITEM	EXPLANATION	YOUR PROD.	PRICE PER UNIT		YIELD (ton/A) [2] Year 1 [2]	Years 2-4			YOUR BUDGET
		Numbers			2.5	4.0	6.0	8.0	5.0
RECEIPTS [3]									
Alfalfa Hay - High Quality	60% of yield		$200	/ton	300.00	480.00	720.00	960.00	600.00
Alfalfa Hay - Lower Quality	40% of yield		$150	/ton	150.00	240.00	360.00	480.00	300.00
Total Alfalfa Receipts					450.00	720.00	1,080.00	1,440.00	900.00
VARIABLE COSTS									
Seed [4]	20 pounds		4.20	/lb	21.00	21.00	21.00	21.00	21.00
Fertilizer [5]									
P_2O_5(lbs)	50 85 110	90	0.8654	/lb	43.27	43.27	73.56	95.19	77.88
K_2O(lbs)	220 300 300	300	0.4842	/lb	106.52	106.52	145.25	145.25	145.25
Lime(ton)	0.5		23.5	/ton	11.75	11.75	11.75	11.75	11.75
Chemicals [6]					30.00	17.33	17.33	17.33	17.33
Fuel, Oil, Grease [7]					22.91	22.91	22.91	22.91	22.91
Repairs [8]					19.12	19.12	19.12	19.12	19.12
Miscellaneous [9]					16.00	16.00	17.00	18.00	18.00
Int. on Oper. Cap. [10]	6 mo		9.0%		12.18	11.61	14.76	15.77	15.00
Custom Hire [11]					12.72	12.72	12.72	12.72	12.72
Hired Labor [12]					0.00	0.00	0.00	0.00	0.00
TOTAL VARIABLE COSTS	-Per Acre				295.46	282.22	355.39	379.04	360.96
	-Per Ton				118.18	70.55	59.23	47.38	72.19
FIXED COSTS									
Labor Charge [12]	5 hours		13.50	/hour	67.50	67.50	67.50	67.50	67.50
Mach. And Equip. Charge [13]					30.12	30.12	30.12	30.12	30.12
Seedbed Preparation/Seeding Costs - Custom Hire [14]					12.51	12.51	12.51	12.51	12.51
Land Charge [15]					95.00	95.00	124.00	157.00	200.00
Management Charge	5% of gross revenue				22.50	36.00	54.00	72.00	45.00

Figure 2. Alfalfa production cost with 15 lb/acre seeding rate.



VARIABLE COSTS												
Seed [4]			***15***	pounds		***4.20***	/lb	15.75	15.75	15.75	15.75	**15.75**
Fertilizer [5]												
P_2O_5(lbs)	50	85	110	***90***	***0.8654***	/lb		43.27	43.27	73.56	95.19	**77.88**
K_2O(lbs)	220	300	300	***300***	***0.4842***	/lb		106.52	106.52	145.25	145.25	**145.25**
Lime(ton)		***0.5***			***23.5***	/ton		11.75	11.75	11.75	11.75	**11.75**
Chemicals [6]								30.00	17.33	17.33	17.33	**17.33**
Fuel, Oil, Grease [7]								22.91	22.91	22.91	22.91	**22.91**
Repairs [8]								19.12	19.12	19.12	19.12	**19.12**
Miscellaneous [9]								16.00	16.00	17.00	18.00	**18.00**
Int. on Oper. Cap. [10]		***6***	mo		***9.0%***			11.94	11.37	14.52	15.54	**14.76**
Custom Hire [11]								12.72	12.72	12.72	12.72	**12.72**
Hired Labor [12]								0.00	0.00	0.00	0.00	**0.00**
TOTAL VARIABLE COSTS		**-Per Acre**						289.97	276.73	349.90	373.56	**355.47**
		-Per Ton						115.99	69.18	58.32	46.69	**71.09**

Figure 3. Alfalfa production cost with 10 lb/acre seeding rate.



VARIABLE COSTS												
Seed [4]			***10***	pounds		***4.20***	/lb	10.50	10.50	10.50	10.50	**10.50**
Fertilizer [5]												
P_2O_5(lbs)	50	85	110	***90***	***0.8654***	/lb		43.27	43.27	73.56	95.19	**77.88**
K_2O(lbs)	220	300	300	***300***	***0.4842***	/lb		106.52	106.52	145.25	145.25	**145.25**
Lime(ton)		***0.5***			***23.5***	/ton		11.75	11.75	11.75	11.75	**11.75**
Chemicals [6]								30.00	17.33	17.33	17.33	**17.33**
Fuel, Oil, Grease [7]								22.91	22.91	22.91	22.91	**22.91**
Repairs [8]								19.12	19.12	19.12	19.12	**19.12**
Miscellaneous [9]								16.00	16.00	17.00	18.00	**18.00**
Int. on Oper. Cap. [10]		***6***	mo		***9.0%***			11.70	11.13	14.28	15.30	**14.52**
Custom Hire [11]								12.72	12.72	12.72	12.72	**12.72**
Hired Labor [12]								0.00	0.00	0.00	0.00	**0.00**
TOTAL VARIABLE COSTS		**-Per Acre**						284.49	271.25	344.42	368.07	**349.99**
		-Per Ton						113.79	67.81	57.40	46.01	**70.00**

References

Rankin, Mike. 2008. Alfalfa seeding rates: how much is too much? Univ. of Wisconsin Extension publication. http://www.uwex.edu/ces/crops/AlfSeedingRate.htm

Hall, M.H., C.J. Nelson, J.H. Coutts, and R.C. Stout. 2004. Effect of seeding rate on alfalfa stand longevity. Agronomy Journal 93:717-722. http://agron.scijournals.org/cgi/reprint/96/3/717

Ward, Barry and Mark Sulc. 2008. 2008 Alfalfa hay production budget: spring seeding-4 year stand. The Ohio State. http://aede.osu.edu/programs/FarmManagement/budgets/crops-2008/alfhay08.xls

Burdine, Kenny. Forage enterprise budget. The University of Kentucky. http://www.ca.uky.edu/AgEcon/index.php?p=29

Alfalfa Hay for Horses: Myths vs. Reality

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How Much Hay Does A Horse Need?

A horse owner once described their Quarter Horse gelding as "a hole in the stall that I throw hay into"! This description is certainly accurate….a 1200 lb gelding used for light recreational riding will consume about 700 lbs of hay per month during the winter in Kentucky. If the horse is kept in a place with minimal pasture, yearly hay consumption will be about 4 tons. Restricting hay intake can lead to digestive disturbances and behavior problems, so it is recommended that most horses be allowed access to 1.5 – 2.0 lbs of hay (or pasture equivalent) for each 100 lb of body weight (so 18 – 24 lb of hay for a 1200 lb horse). The amount of hay a horse needs will be influenced by the nutrient requirements of the horse as well as the nutrient content of the hay, and any other feeds the horse is receiving. Lactating mares will consume higher amounts of forage than horses at maintenance. Elite performance horses and weanlings might receive somewhat lower levels of forage because they will be receiving significant amounts of concentrate. Nonetheless, the ***minimum*** hay (or pasture) intake for any horse should be above 1 lb of hay for each 100 lb of body weight. When choosing, or producing, hay for horses, several factors should be considered. Cleanliness of the hay, nutrient value, palatability and cost are all important.

Is It Okay to Feed Moldy Hay to My Horse?

Hay that is high in dust or mold can irritate the horse's respiratory tract. Optimum athletic performance depends on a healthy respiratory tract, therefore dusty/moldy hay should never be fed to horses used (or intended for) athletic events. A chronic respiratory disease commonly called "heaves" can be aggravated by moldy and dusty hay. Horses with heaves can have so much difficulty breathing that even mild exercise is impossible. In addition, moldy hay can contain toxins that can affect the horse if they are ingested.

Horse owners should not rely on the nutritional wisdom of horses to prevent problems associated with moldy hay. Horses will usually avoid small patches of moldy

hay, but selectivity decreases as hunger increases. Also, in one study horses accepted slightly moldy red clover just as readily as clean alfalfa!

Is it True that Alfalfa Can Make Horses Sick?

Good quality alfalfa hay that is fed in appropriate amounts will not make normal horses sick. Allowing horses unlimited access to very high quality alfalfa hay may result is some digestive upset (such as diarrhea). Horses that have restricted exercise and low nutrient needs can also get too fat if too much high quality alfalfa hay is fed. Therefore, it may be necessary to restrict the amount of very high quality alfalfa that is fed to some horses; especially those with lower nutrient requirements. High quality alfalfa is most useful for horses with high nutrient requirements such as weanlings. Mid and late bloom alfalfa hay as well as alfalfa-grass mixes can be fed to most classes of horses.

Recent research suggests that alfalfa can be more beneficial to the equine digestive tract than some other hays. Many performance horses develop stomach ulcers. No one understands exactly why horses get stomach ulcers, but stress and diet have been proposed as the two most likely causes. A study at Texas A&M University examined the stomachs of horses in training that were receiving diets of forage and grain. When alfalfa was used as the forage, the incidence and severity of the stomach ulcers was less than when grass hay was used as the forage. This study supported an earlier experiment in Tennessee that suggested that a high concentrate diet that contained alfalfa hay was healthier for the stomach than a diet that utilized grass hay. These researchers have suggested that alfalfa might buffer stomach acid more effectively than grass hay because it is higher in calcium, protein and potassium.

Horse owners should be aware that alfalfa hay has been associated with a few problems in horses. Alfalfa hay that may be contaminated with blister beetles should not be fed to horses. Blister beetles contain a toxin that can be fatal to horses. In some parts of the U.S., a small percentage of horses fed alfalfa hay have developed intestinal stones. These “enteroliths” are composed of magnesium and other minerals that collect around some type of small object. If an enterolith becomes large enough it can block the gastrointestinal tract and cause colic, and potentially death. Although enteroliths can occur, their incidence is quite low.

Doesn’t the High Protein Content of Alfalfa Cause Problems?

A normal adult horse will not be negatively affected in any way by a diet that contains a small or moderate excess in protein. On a dry matter basis, good quality spring pasture grass contains about the same concentration of crude protein as average mid to late bloom alfalfa hay. The excess nitrogen in high protein feeds will be excreted in the urine, so horse owners that feed alfalfa to adult horses may find that the horses drink more water and urinate more than when they use a grass hay.

It is a common myth that excess protein causes bone and joint problems in growing horses. Research studies have found that excess calories and rapid growth may predispose horses to growth problems but that excess protein alone is not a factor.

Isn't Hay Just Filler?

No! Hay (or pasture) is an important source of nutrients for all types of horses. Good quality alfalfa or alfalfa-grass hay can meet most of the nutrient needs of adult horses at maintenance, broodmares in early gestation and adult horses in light work. These horses may need a salt source and possibly a small amount of additional supplementation, but hay (or pasture) should comprise the majority of their diet.

Horses with higher requirements (lactating mares, growing horses, horses in moderate or heavy exercise) can obtain 50-70% of their nutrients from good quality alfalfa or alfalfa-grass mix hay, and the remainder from a grain-based concentrate. The amount and composition of the concentrate should be adjusted to complement the type and amount of hay that is being fed.

How Important is Price?

Hay purchases should be based on ***value.*** A "high-value" hay is highly palatable. Lower quality hay is often lower in palatability. Hays that are lower in palatability will have higher rates of waste. If the hay has fewer nutrients per pound, it will be necessary to feed more pounds to achieve the same nutrient intakes, or it will be necessary to provide more supplemental concentrate. A high-value hay is one that contributes to the most economical feeding program while still providing adequate nutrition.

Table 1 gives a few examples of how hay quality and price are related to the total cost of a feeding program. These examples are only for illustration of the principals. New calculations must be made for each feeding situation because the prices of hay and concentrate will vary.

Hay should be purchased on an equivalent weight basis. Comparing prices by the ton is easy. "By the bale" prices should also be converted to a weight basis. Hay that costs $5.00/bale can be less expensive per pound than hay that costs $4.50 a bale, depending on the size of the bale. If the $5 hay weighs 65 lb then the hay costs 7.7 cents a pound. If the less expensive hay bale weighs 45 lb then the cost per pound is 10 cents! Horses eat by the pound….not by the bale!

Table 1: Effect of Hay Quality on Total Monthly Feeding Costs

EXAMPLE HAY AND CONCENTRATES

	Alfalfa* (mid-bloom)	Timothy/Orchardgrass** (late maturity)
Hay Cost/ton	$200	$140
Hay Cost/lb	$0.10	$0.07
Concentrate Cost/50lb bag***	$10.00	$11.00
Concentrate cost/lb	$0.20	$0.22

EXAMPLE HORSES

1200 lb gelding, light exercise (no available pasture)		
Total Hay Fed	22 lb	22 lb
Daily Hay cost	$2.20	$1.54
Expected Wasted Hay	1 lb	3 lb
Hay Consumed	21 lb	19 lb
Concentrate Needed	2 lb	6 lb
Concentrate Cost	$0.40	$1.32
Total Feed Cost/day	$2.60	$2.86
Total Feed Cost/month	$78	$86

1200 lb mare, lactating (no available pasture)		
Total Hay Fed	30 lb	30 lb
Daily Hay cost	$3.00	$2.10
Expected Wasted Hay	2 lb	5 lb
Hay Consumed	28 lb	25 lb
Concentrate Needed	6 lb	11 lb
Concentrate Cost	$1.20	$2.42
Total Feed Cost/day	$4.20	$4.52
Total Feed Cost/month	$126	$136

*Midbloom alfalfa containing 0.9 Mcal of digestible energy per pound (as fed)
**Late maturity Timothy/Orchardgrass containing 0.7 Mcal digestible energy per pound (as fed)
***Concentrate with more fortification required when grass hay is fed

Where Can I Get Additional Information?

Alfalfa Hay: The High Quality Hay for Horses. Accessed on 1/15/09. Available at http://www.alfalfa.org/pdf/Alfalfa%20for%20Horses%20Revised.pdf

The Nutrient Requirements of Horses. National Research Council. 2007. National Academy Press, Washington DC

Southern Forages. Ball, D.M., C.S. Hoveland and G.D. Lacefield. 2002. PPI. Norcross Georgia

Gastric ulcer syndrome in exercising horses fed different types of hay. Lybbert, T., P. Gibbs, N. Cohen and D. Sigler. 2007. Proc. Equine Science Symposium. Baltimore, MD.

And visit the website for the University of Kentucky College of Agriculture! www.ca.uky.edu

ALFALFA AS A GRAZING CROP

Bill Payne
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Planning a "Forage Sequence" implies that a stockman provides nutritious and palatable forage crops for grazing for as many days of the year possible. Cool season perennial grasses and legumes give Kentucky forage growers an competitive advantage over those in many other states. That advantage declines during the heat of our summers, however. Providing a solution to our "Summer Slump" is a challenge to stockmen throughout the South. This "Summer Slump" is the result of low yield of cool season forages during the heat and drier conditions of July, August and September. Another factor hindering livestock gains is the fescue endophyte which affects heat tolerance and gains in cattle.

It is to the advantage of stockmen to provide alternative forages during the heat of summer. Summer annuals and native perennial grasses provide alternatives. A better alternative, in my opinion is a mixture of alfalfa and orchardgrass.

Why Alfalfa? There are a number of advantages, higher quality nutrition being one. Secondly, alfalfa provides options for its use: hay, haylage and grazing. Alfalfa has a very deep root system which allows it to grow well even in drought situations. Alfalfa is a legume which allows it to produce its own nitrogen, benefiting both the alfalfa and the orchardgrass. This is a valuable benefit with today's high nitrogen prices. Alfalfa's typical stand life is more than twice as long as that of red clover. These are all good reasons to plant and graze alfalfa/grass mixtures.

When would you graze alfalfa? The last week of April through the 15th of September provide the primary grazing season for alfalfa. After allowing the crop to replenish its nutrient reserves from September 15 until November 1 (or 24º F. whichever comes first) grazing can be completed for the season. Since early May offers abundant forages other that alfalfa, I normally harvest the first cutting of alfalfa/orchardgrass as balage for winter use. We graze most fields the rest of the summer.

We plan a year ahead for new establishments. A soil test is the first step. Soil pH should be >6.5. Phosphorus and potash should be at adequate levels. Applying needed lime or nutrients should be done well ahead of seeding. Secondly, I select the alfalfa and the orchardgrass variety by utilizing the UK variety trial results. I use productive, grazing tolerant varieties. I prefer the orchardgrass to be a late maturing one.

Controlling competing vegetation is the next consideration. If I am planting into an existing sod, such as fescue, a non selective herbicide such as Roundup applied the previous September has given very good control. This is a great way to convert fescue into a much more productive crop. Sometimes a second application in March is also necessary. If you follow a row crop, a spring application only would be needed. I try to wait at least ten days after applying Roundup before planting alfalfa.

I aim to plant during the first week of April. Using a no-till drill set to plant no move that ½ inch deep has given very good results. You should be able to see a few seed on top of the ground behind the drill if your seed depth is correctly set. My planned seeding rate is 16-18 pounds of alfalfa and 6-8 pounds of orchardgrass. Most Kentucky springs provide moisture adequate to insure germination. The best managers recommend that the alfalfa bloom before is it harvested for the first time. Harvest could be for hay or grazing.

In the past I have proven to myself that alfalfa will not tolerate continuous grazing pressure. Now I utilize Management Intensive (or Rotational) Grazing to harvest the crop. I try to move our heifers after they have harvested the alfalfa but before they have been on the paddock for a week. By using temporary electric fencing and portable water tubs, we can create the smaller paddocks necessary to get the crop harvested. We then move the heifers to the next paddock and provide a needed recovery period of about four weeks.

In managing an alfalfa grazing plan, there can be several potential problems. These are manageable, however. The first problem that many would mention is bloat. In raising about two thousand dairy heifers, I have lost two to bloat. These both were on fescue pasture at the time. I have lost none while grazing alfalfa. Planting grass with the alfalfa can increase production as well as decreasing bloat potential. When introducing cattle to alfalfa for the first time, it might be well to limit the first grazing to several hours to allow them to become acclimated. Do not expose hungry cattle to lush alfalfa. Grazing when the crop is wet with dew is not a good idea. There are several supplements which limit bloat; one is Bloat-Guard, the other is Rumensin. Rumensin needs daily intake to be most effective. In my experience, the fear of bloat prevents many from enjoying the many benefits of the “Queen of Forage Crops”.

Grazing alfalfa can also have a detrimental effect on the udders of mid to late gestation dairy heifers. We have seen some flushing of udders in heifers in this stage of growth. Other forage sources are used for these heifers.

Our heifers return 70+ percent of their nutrients to the soil in the form of urine and manure. This is very beneficial in today’s environment of high priced fertilizer. We do soil samples annually to insure that fertility is not a limiting factor. We apply Boron every other year.

Grazing alfalfa has allowed us to defeat the “Summer Slump” while providing a highly nutritious forage for our heifers. By harvesting via grazing, we can avoid the

stress of cutting, drying and baling hay during the frequently rainy weather of Kentucky summers. Our heifers continue to gain well through the heat of summer ensuring that they meet their weight goals.

In summary, alfalfa provides numerous advantages to the grazier. It can provide the highest quality forage of any available crop in our climate. Alfalfa can be harvested in several ways, also. It can be grazed or cut for hay or haylage. It can, therefore, provide quality forage spring, summer, fall and winter. In “the fescue belt” alfalfa can provide a bridge to supply a good forage option during the “summer slump” when our cool season grasses are apt to go dormant. Alfalfa is a perennial and can provide forage for four or more years. Then, when it is time to retire an alfalfa stand, it can provide nitrogen credits to the next crop.

I challenge each of you to take advantage of alfalfa’s many grazing benefits. I think that you will find, as I have, that good grazing equals good profits.

KEYS TO SUCCESS WITH ALFALFA BALAGE

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Baled silage (or Balage) has many advantages over conventional hay production. Losses during the curing, baling, storage, and feeding phases are each dramatically lower when the forage is conserved as Balage rather than hay. Of course, this comes at an expense. The cost of the wrapper (generally $14,000 – 21,000), plastic wrap (usually $4-6 per ton of DM), and added labor can make this system quite costly. Furthermore, there is an environmental cost for disposal of the plastic. However, Balage enables the alfalfa producer to quickly harvest a crop with more independence from unfavorable weather and to create a more palatable product.

This paper builds from Dr. Gary Bates' (Univ. of Tennessee) presentation from last year's KY Alfalfa Conference entitled "Is There a Benefit to Alfalfa Balage?" (see pgs. 27-28 of http://www.uky.edu/Ag/Forage/28th%20Kyalfproc%20with%20cover%20plus.pdf, the proceedings of the 28th KY Alfalfa Conference here:). In that article, he presented several details on how Balage can be used to conserve higher quality alfalfa. When a producer begins to work with Balage, there can be a steep learning curve. In this paper, 10 practical tips are presented that can help the Balage producer to ensure success.

1) CUT DOWN NO MORE THAN YOU CAN HANDLE.

One of the most common mistakes that producers make when starting to make Balage is they will lay down too much forage and not have enough time or labor to bale, transport, and wrap the bales quickly enough. For example, a producer may be used to handling 30 acres of hay at one time. However, because Balage bales must be wrapped within 12 hrs of baling, the producer will find that the amount of forage that has been cut is not the bottleneck… the bottleneck is the wrapping operation.

To ensure that no more forage is cut down than can be handled, know how fast the bales can be wrapped. Each bale wrapper will have a different wrapping rate, so it is important to read the manufacturer's specifications. Some bale wrappers can wrap as fast as the machine can be loaded (80-100 bales per hr), while many others will take much more time. Furthermore, just because the manufacturer says it will wrap at a certain rate does not mean that it will work that fast in practice. It is likely, especially if

one is just getting started in Balage, that the wrapping rate will effectively be only 1/2 - 2/3 of that which is specified in the manual. With experience, the rate at which one can wrap bales will increase.

2) CHOOSE THE RIGHT BALE WRAPPER

Since the bale wrapper serves as the primary bottleneck in processing Balage bales, the selection of the right bale wrapper for a given operation is critical. In addition to the cost of the wrapper, consider the bale wrapping rate of the equipment, the amount of labor required/available, and the size of bales that the equipment will accommodate.

Bale wrappers can generally be classified into three basic categories (Figure 1 and Table 1). Table 1 provides generalizations about each of these three basic categories with respect to wrapping rate, labor requirement, and bale capacity.

Figure 1. Examples of three basic categories of Balage wrappers: (L to R) individual bale wrapper on a 3-pt. hitch platform, individual bale wrapper on a trailer platform, and an in-line bale wrapper.

Table 1. Generalizations about different styles of bale wrapping equipment.

Wrapper Style	Bale Wrapping Rate *(bales/hr)*	Labor Requirement	Typical Max. Bale Size Capacity	Cost
Individual Bale Wrapper				
3-pt. Hitch Platform	20 - 30	Medium (One person wraps, one person unloads wagon)	4' wide x 5' tall	$3 - 14,000
Trailer Platform	20 - 40	Medium – High (One person wraps, one person unloads wagon and, on some models, loads wrapper)	4' wide x 5' tall	$5 - 18,000
In-line Bale Wrapper*	60 - 100	Low – Very Low (One person wraps and unloads wagon)	Up to 5' wide x 6' tall	$13 - 24,000

* In-line wrappers also usually use 30-50% less plastic than individual bale wrappers.

3) EXPLORE YOUR OPTIONS

Many producers find themselves in a financial quandary: they can not necessarily justify the ownership of a bale wrapper for the size of their operation, but really would benefit from the advantages that Balage offers. In this situation, the producer should consider options other than “Own for Own Use.” At least two other options are available to most producers: i) to own the equipment and use it for both their own use and to perform custom work with it on the side or ii) to hire in or rent the wrapper.

Certainly, this key to success is closely related to key #2, especially if one is considering hiring out themselves and/or their equipment. If custom work is expected, determine the amount of travel that will be done and the volume of bales that will be wrapped at each location. If it is expected that there will be many small jobs, then an individual bale wrapper is probably best. However, if there will be relatively few jobs but each involving many bales, then an in-line wrapper will likely be better.

4) BALE AT THE RIGHT RANGE OF MOISTURE

The ideal moisture range for alfalfa or other forage that is to be made into Balage is 50 – 65% moisture. If the moisture drops below 50% moisture, the fermentation process will be hampered or may not occur at all. This leads to silage that may heat or become otherwise unstable. Poor fermentation also can lead to unsatisfactory levels of mold growth or smells. Attempts to add moisture by wetting down the bales in some way will not successfully raise moisture on the interior of the bale and will result in more surface mold.

On the other end of the spectrum, the forage can spoil or even rot when moisture levels exceed 65-70% moisture. Excessive moisture results in greater bale deformation (“squatty” bales) and may even cause the forage to seep effluent. In addition to these problems, excessive moisture increases the risk of listeriosis or botulism.

It is common for too much forage to be cut (see key #1) for the conditions, and the forage may get too dry before it can be baled and wrapped. There are a couple strategies that can help buffer against loosing moisture too quickly, even if an appropriate amount of forage is cut. First, when conditions are such that the wilting will occur fairly rapidly, it is generally a good practice to cut the forage on one afternoon and bale and wrap on the next day. This will use the slower drying rate during the night time to help ensure that the forage doesn’t dry too quickly and maintain a more uniform moisture in the crop. If a mower-conditioner is available that allows for the forage to be windrowed, some (or in many cases, all) of the crop may need to be windrowed so that the forage will dry more slowly. In the spring/fall or when drying will not occur as quickly, it may be best to allow the forage to wilt for a full day (or possibly longer). In this situation, it is best to leave a full swath rather than windrowing the forage.

5) MAKE GOOD BALES

Another key to making good Balage is to pay close attention to the baling operation and the bales that are being produced. First, ensure that the size of the bales is appropriate for the size of the equipment used to transport and wrap the bales. Balage bales will be roughly twice as heavy as a hay bale of the equivalent size. Most producers find that a 4' x 5' bale is the most efficient size for their equipment, as these generally will be around 1100-1400 lbs. Tightly made (dense) bales ferment better, so it may be helpful to adjust the hydraulic pressure on variable-chambered (belt-type) balers so that a dense bale can be made. If an in-line bale wrapper is being used, it is also critical to ensure that the edges of the bales are packed well so that the bales will be uniform and have square edges where they abut to one another.

One final note on baling procedure is on the binder that is used. Plastic twine is the best and most economical choice. Normal sisal twine contains chemicals residues from the manufacturing process that can cause a breakdown in the UV-inhibitor of the plastic wrap. Consequently, large splits can form in the plastic wrap over time and result in spoilage. Plastic net-wrap can be used as a binder, as well. Though the net-wrap helps prevent bale deformation, it is more expensive and can make the binder material and plastic wrap more difficult to remove during the feed-out phase.

6) CHOOSE AN APPROPRIATE SITE FOR WRAPPING

Another key consideration is in the selection of an appropriate site for storage. It is best to wrap the bales where they will be stored, even if the bales are individually wrapped. Excessive handling of the bales after wrapping can compromise the integrity of the plastic wrap and introduce oxygen to the forage. It is also critical for the bales to be wrapped within 12 hrs of being baled. This prevents excessive heating and aerobic deterioration of the material.

When choosing a site, the proximity to the field and to the site where the forage will be fed are equally important to consider. It is best to place the bales on a solid sod or along a firm roadbed so that adverse conditions during feed-out will cause minimal damage or soil disturbance. Bales should also be placed in an area so as to protect them from punctures. Avoid areas with stubs, exposed roots, or rocks. Groundhogs, birds, and other vermin will sometimes damage bales. By storing Balage in an open area and at least 10 ft from a fence-line, field borders, or other areas of shelter for wildlife, the bales will be less prone to damage from these pests.

7) APPLY ENOUGH PLASTIC BUT NO MORE

It is important to ensure that enough plastic is placed around the bales to exclude oxygen and allow for fermentation. However, too much plastic will drastically increase

the cost of producing baled silage. For in-line bale wrappers, a minimum of 6 – 8 layers of plastic needs to be applied with at least 10 – 12 layers at the joints where two bales abut one another. For individual bales, at least 4 layers of plastic (2 layers made on the first pass, and 2 additional layers on a second pass) are necessary. If the bales are expected to be stored for a long period of time (> 8 months), then 20% or more plastic should be applied.

The failure to apply enough plastic can cause unstable silage and reduce animal acceptance of the forage. Balage that has been properly formed can be very palatable and can, in fact, be more acceptable to the animals than alfalfa hay of similar quality (Figure 2).

Ensure that the plastic is being pre-stretched according to the manufacturer's instructions (usually 55% stretch) and that it is being applied with the tacky side toward the bale. The stretching and wrap's adhesive ensure a sufficient seal.

8) FEED IT IN AN APPROPRIATE WAY

It is a pretty safe assumption that alfalfa Balage will be relatively high in quality. (Of course, just how "high in quality" must be determined by a forage test.) Thus, it is important to ensure that this quality of forage is being put to its best use. High quality demands by stocker calves, replacement heifers, dairy cattle, and other high performance animals make these animal classes a good fit for alfalfa Balage. Balage can be used in TMRs, and some bale grinders can process these bales. However, it may be necessary to split or slice the bales if the bales are very dense and/or are oversized for the grinding facility. Of course, whole bales can be fed ad libitum like a hay bale. It is advisable, however, to use a hay ring or cone feeder to lessen feeding losses.

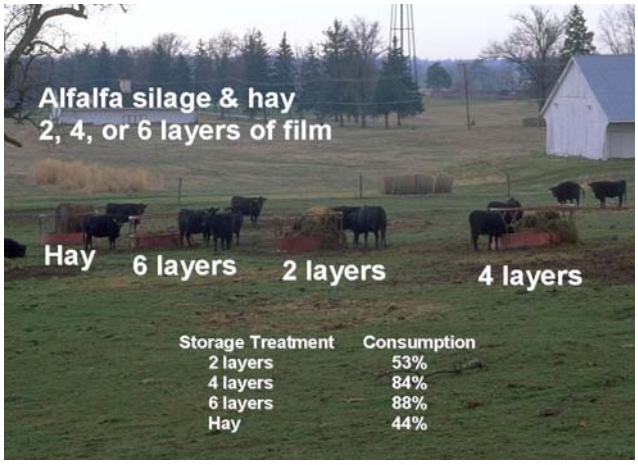

Figure 2. Animal acceptance of baleage prepared with varying levels of plastic coverage relative hay of comparable quality.

9) FEED THE BALES WITHIN 9 MONTHS

Over time, the plastic becomes more permeable to oxygen (allows more air into the bale) and the ensiled material will begin to deteriorate. Eventually, the forage begins to spoil and rot. In addition to this danger, these older bales deform and become very difficult (and unpleasant) to handle. Thus, it is important for Balage bales to be produced and consumed within the same season. As a general rule of thumb, the bales should be fed within 9 months of being wrapped.

10) HAVE A PLAN FOR HANDLING THE PLASTIC

Though this final note doesn't sound like it would need to be factored in, it is still an important "key to success." This note addresses a serious, but often overlooked disadvantage of Balage, which is the volume of waste plastic that can be produced. Many folks become disgusted with Balage because they have to deal with all the waste plastic it produces. Therefore, it is recommended that a producer devise a routine for collecting and disposing of this plastic. Compressing the material in an unused tobacco baler, barrel, or other such container will be helpful in reducing the bulk of the plastic. Since this waste plastic cannot be recycled (it is too dirty), it must be dumped in a landfill. Burning the plastic is not safe, may have adverse effects on the environment, and leaves a residue that is difficult to clean up. Thus, burning is not recommended.

ADDITIONAL RESOURCES

Several additional articles are available for those who may be interested in learning more about Balage. Two UK Extension articles that are most helpful include: "AGR-173: Baling Forage Crops for Silage" and "Baled Silage: Frequently Asked Questions." Both of these articles, along with many other informative articles can be found on the UK Forage Website (http://www.uky.edu/Ag/Forage/).

Roundup Ready® Alfalfa and Future GMOs in Alfalfa

Dennis Gehler
Forage Product Manager
Winfield Solutions, LLC

Regulations affecting Roundup Ready® alfalfa

Monday	June 27, 2005	"…which have been genetically engineered for tolerance to the herbicide glyphosate, are no longer considered regulated articles…"
Monday	March 12, 2007	"All sales of Roundup Ready alfalfa seed are prohibited pending the Court's issuance of permanent injunctive relief."
Thursday	May 3, 2007	"Roundup Ready alfalfa is a regulated article"

Much is happening as we go to press for the proceedings of the 29th Annual Kentucky Alfalfa Conference. The most up to date information will be shared with you on February 19th regarding this topic.

Additionally recent work on traits added to alfalfa such as improving whole plant digestibility, improved protein utilization, improved water use efficiency, easier ensiling of high moisture alfalfa, and minimizing the risk of bloat will be discussed. The potential benefits, the science supporting them, and the stage of discovery will be discussed as well.

Cost and Return of Alfalfa Hay Production

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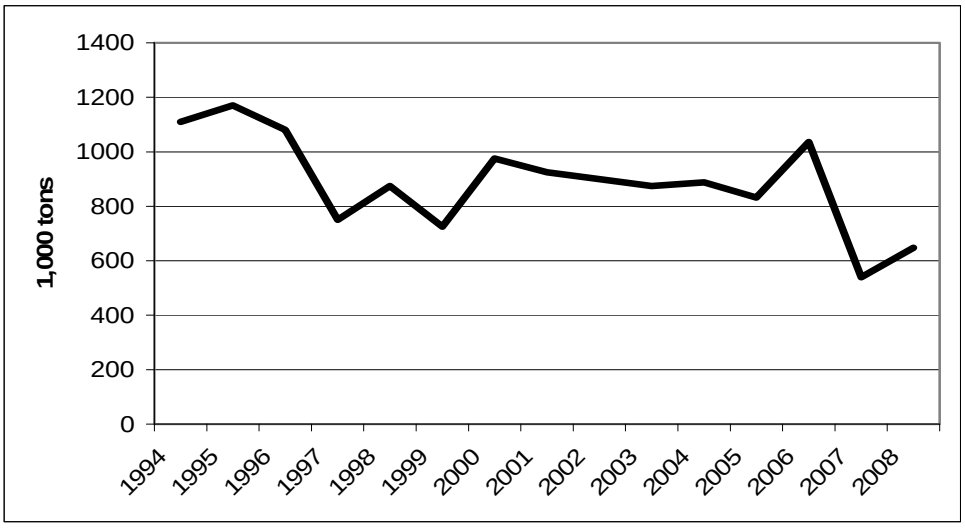
The last few years have been nothing short of a roller coaster ride for Kentucky agriculture. Kentucky is coming off back-to-back drought years, which have challenged both livestock and crop producers. At the same time, farmers are dealing with decreasing output prices and rising input prices. This is a recipe for pure frustration and alfalfa producers have not been isolated from these challenges.

Alfalfa has always been somewhat under that radar screen in terms of production in KY. It has historically been a fairly profitable crop, yet Kentucky typically harvests around one quarter of one million acres annually for hay. Alfalfa was greatly affected by the adverse growing conditions over the last two years. This impact can be seen below in figure 1, which shows the recent history of Kentucky Alfalfa production.

Figure 1: Kentucky Alfalfa / Alfalfa Mix Hay Production (1994 – 2008)

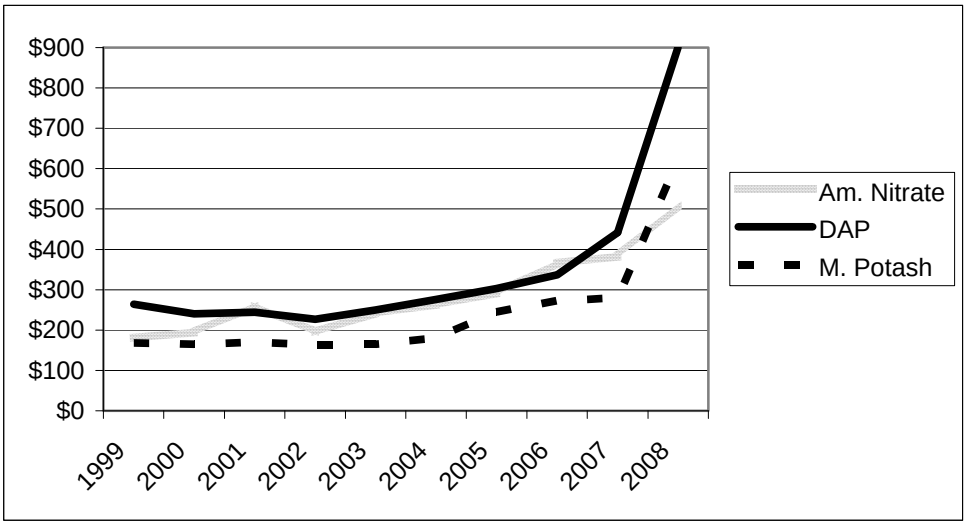


Source: USDA NASS

Both 2007 and 2008 were low yield years. A spring freeze, followed by severe drought left estimated Kentucky alfalfa yields at 1.8 tons per acre in 2007. Production was depressed in 2008 due to both drought and a 40,000 acre decrease in harvested alfalfa acres. This likely occurred for several reasons including dry weather, high seed costs, and competition for ground from corn and soybeans. The result can be seen above with incredibly low production levels in each of the last two years.

In addition to weather and yield concerns, rising input costs have also been a major concern for alfalfa producers on the last several years. Rising fuel and fertilizer costs have drastically changed the profit expectations for alfalfa hay. Figure 2 shows the trend in common fertilizer prices from 1999 to 2008. Notice the steady upward trend followed by a projected drastic jump from 2007 to 2008.

Figure 2: Common Fertilizer Prices: 1999 to 2008



Source: KY Agricultural Statistics and Annual Report (1999 -2007), 2008 is estimated

These same challenges will remain at play in 2009. While there are some signs of decreasing fuel and fertilizer prices, they will remain high by historical standards. At the same time, weather remains the biggest wildcard. It is virtually impossible to make money on alfalfa with the types of yields that we have seen over the past couple years. And, alfalfa price is very sensitive to local supplies and alternative feed prices.

Figure 3 presents an estimated alfalfa budget for 2009. This budget skeleton is available on-line in spreadsheet form at the following address: http://www.ca.uky.edu/agecon/index.php. Simply click on budgets and look for "AEC Forage Budgets". While attempts have been made to make this budget as realistic as possible, one should clearly modify this budget based on their own situation.

The budget is set up for alfalfa square bale hay production and assumes a yield of just over five tons per acre. The assumed sale price is $125 per ton or $4.69 per 75 lb square bale. This price is meant to include production and moving costs, not delivery to buyer. One should also be aware that this price would represent the price of an average alfalfa bale. In some cases, lower quality bales may move at a considerable discount to higher quality bales. Cost estimates are based on the best estimates available, but certainly should be changed based on actual quotes in the producer's area.

Figure 3: Estimated Alfalfa Budget for 2009

ALFALFA HAY ENTERPRISE
ESTIMATED COSTS AND RETURNS

Return to Intro Page

Total Acres in Enterprise:	**200**	acre
Number Bales per Acre:	**140.0**	
Weight per Bale:	**75**	lbs

	AMOUNT	UNIT	PRICE	FREQUENCY	TOTAL Per Acre	*TOTAL Enterprise*
GROSS RETURNS						
Hay (Sold or On-Farm Value)	5.25	tons	**$125.00**	**annually**	$656.25	***$131,250***
VARIABLE COSTS						
Seed	**20**	lbs	**$5.00**	**every 5 years**	$20.00	***$4,000***
Nitrogen	**0**	lbs	**$0.45**	**annually**	$0.00	***$0***
Phosphorus	**75**	lbs	**$0.60**	**annually**	$45.00	***$9,000***
Potassium	**300**	lbs	**$0.75**	**annually**	$225.00	***$45,000***
Boron	**2**	lbs	**$10.00**	**every 2 years**	$10.00	***$2,000***
Lime	**3**	tons	**$15.00**	**every 3 years**	$15.00	***$3,000***
Herbicides	1	acre	**$30.00**	**annually**	$30.00	***$6,000***
Hay Preservative	1	acre	**$0.00**	**annually**	$0.00	***$0***
Fuel and Oil	1	acre	**$50.00**	**annually**	$50.00	***$10,000***
Repairs	1	acre	**$30.00**	**annually**	$30.00	***$6,000***
Custom Application	1	acre	**$0.00**	**annually**	$0.00	***$0***
Equipment Rental	1	acre	**$0.00**	**annually**	$0.00	***$0***
Cash Land Rent	1	acre	**$0.00**	**annually**	$0.00	***$0***
Hired Labor	**3**	hours / ac	**$10.00**	**annually**	$30.00	***$6,000***
Interest (1/2 year)	$455.00	dollars	**7.0%**	**annually**	$31.85	***$6,370***
TOTAL VARIABLE COST					$486.85	***$97,370***
RETURN ABOVE VARIABLE COST					$169.40	***$33,880***
FIXED COSTS						
Annual Interest on Investment	1	acre	**$30.00**		$30.00	***$6,000***
Annual Depreciation of Capital Assets	1	acre	**$50.00**		$50.00	***$10,000***
Insurance: Casualty and Liability	1	acre	**$10.00**		$10.00	***$2,000***
Operator and Family Labor	**3**	hours / ac	**$10.00**		$30.00	***$6,000***
TOTAL FIXED COST					$120.00	***$24,000***
TOTAL COSTS					$606.85	***$121,370***
RETURN TO LAND AND MANAGEMENT					$49.40	***$9,880***

Break Even Price	**$92.73**	per ton to pay ***VARIABLE*** costs at	**5.3**	tons per acre
Break Even Yield	**3.9**	tons to cover ***VARIABLE*** costs at	**$5.25**	per ton
Break Even Price	**$115.59**	per ton to cover ***TOTAL*** costs at	**5.3**	tons per acre
Break Even Yield	**4.9**	tons to cover ***TOTAL*** costs at	**$125.00**	per ton

University of Kentucky, College of Agriculture, Cooperative Extension Service.

Finally, I think is important that we look at the sensitivity of this return to land and management per acre to both price and yield. This will help the producer think about the level of risk that is involved with the alfalfa enterprise this year. Table 1 below is a simple sensitivity table that shows estimated returns to land and management using the same set of assumptions as shown in the budget estimate in Figure 3. The only items changed from the budget in figure 3 are price per ton and yield per acre.

Table 1. Return to Land and Management as Price and Yield Change

	Price per ton Received				
Yield	**$100**	**$125**	**$150**	**$175**	**$200**
3.5 tons	($256.85)	($169.35)	($81.85)	$5.56	$93.15
4.0 tons	($206.85)	($106.85)	($6.85)	$93.15	$193.15
4.5 tons	($156.85)	($44.35)	$68.15	$180.65	$293.15
5.0 tons	($106.85)	$18.15	$143.15	$268.15	$393.15
5.5 tons	($56.85)	$80.65	$218.15	$355.65	$493.15
6.0 tons	($6.85)	$143.15	$293.15	$443.15	$593.15

Table 1 shows the amount of risk that is out there in 2009 and is probably a better way to look at the upcoming year than a single snapshot as in Figure 3. Notice that at a price of $100 per ton, money is still lost at a six ton yield per acre. On the other end of the spectrum, note that if yields are as low as 3.5 tons per acre, price must be nearly $175 per ton to cover all costs. Producers should look at table 1 and think about where their yields are in a typical year and what prices they have been moving hay for recently.

While 2009 will likely be another challenging year for Kentucky farmers, alfalfa has the potential to be a positive contributor to the farm this year if production costs are reasonable and weather allows for decent production levels. I would strongly recommend that each producer work through a budget similar to figure 3 for their own operation and generate a sensitivity table similar to table 1. Soil conditions, fertilizer costs, machinery compliments, and many other factors will vary greatly across operations in Kentucky. The more effort that is made to adjust the proceeding numbers, the better position the producer will be in to evaluate the costs and returns to alfalfa hay production in 2009.

How I Produce and Market Alfalfa Hay

Clayton Geralds
2008 Kentucky Forage Spokesman
Geralds Farms
Hart County, KY

Clayton Geralds and his son Christopher run a commercial hay farm in Hart County near Munfordville, Kentucky. His total farm size is 560 acres, 300 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 400 acres of alfalfa and alfalfa/orchard grass and 150 acres of timothy, orchard grass, and teff. On average he puts up 70,000 small square bales a year. Clayton is one of the best hay producers in the state and last year won the Charlie Schnitzler Producer Award at the 28th Annual Kentucky Alfalfa Conference. In his presentation Clayton will discuss equipment requirements for establishing, maintaining, and harvesting top quality horse hay. He will also provide an overview of his expectations for yield and quality of his product as well as proper input and storage requirements.

30th Annual Kentucky Alfalfa Conference

February 25, 2010