King's AgriSeeds Inc.

High Energy Forages and Soil-Building Cover Crops

2015 Spring Forage Newsletter

Balance; Protein & Energy

Tim Fritz, GM & Owner King's AgriSeeds, Inc

2013 and 2014 were very profitable years for dairy and livestock farmers. Unfortunately, profitability is predicted to drop substantially this year for dairy farmers in particular. Feed costs are almost always the highest cost on our farms. Producing home grown high forage quality and tonnage is essential for profitability.

But, what is quality forage?

2015 nutritional economics will be different from most years as energy derived from grain has moderated in cost but protein costs remain relatively high. Energy still remains a critical need for livestock and energy supplements cannot overcome lower quality (energy) forages. High quality forages provide high energy levels through two energy sources. We quite often speak about highly digestible fiber as a great source of energy in vegetative grasses (perennial or annual crops). This is definitely true and is controlled by both seed choices and harvest timing.

The other major source of forage energy for a vegetative crop is sugar. High sugars in cut and wilt harvest systems can be increased dramatically simply with proper harvest management. Forage that has been left in windrows over two or three nights simply looses quality because the sugars are consumed by the plant that is still "alive". Aggressive wide swath harvest systems can actually increase the sugar energy content of the forage. When wide swathed and exposed to the sun, the forage actually continues to make sugar for a period of time via photosynthesis.

Aggressively managed forages make milk or meat, as the energy in these forages can approach corn silage levels. The energy, however, is in a different form. The seed you plant also makes a difference, but harvest management will make or break forage quality and it matters much more than the maturity of the crop. Wide swathing, tedding, merging or racking followed by prompt harvest and storage is critical to sugar and NSC levels in your forage.

What's Inside

2014 Data from King's AgriSeeds Mount Joy Research Plots

Mount Joy weather was relatively dry. Alfalfa, Red Clover and Alfalfa Grasses were cut 5 times. Grass Mixtures were cut 4 times. Quality Data is an average from 1stand 3rdcutting using CVAS.

	Tons/DM Per Acre	Crude Protein	NDF (aNDFom)	NDFd30	KD Rate
Alfalfa Grass Mix	7.9	21.5	36.6	56.2	4.6
Grass Mixtures	6.2	12.9	54.2	71.3	6.4
Alfalfa	8.3	22.8	33.2	49.6	4.3
Red Clover	7.3	20.8	34.9	49.5	4.5

Protein can easily be purchased, but it comes at a high cost financially and from the standpoint of nutrient management phosphorus load. Most rations for lactating animals are balanced around 16% or so crude protein. Vegetative harvested grasses, whether they are a small grain such as triticale or a perennial crop, typically test around 16% protein if fertilized properly. Legumes cut at pre-bloom may be as high as 25% protein but have less energy compared to grass. Every farm has different needs but most farms need high forage quality and production. Corn silage and/or forage sorghum can be very high yielding but are low protein crops.

With animal nutrient requirements in mind, creating the optimum cropping system on your farm starts with your soil and climate. Perennial legume grass mixtures should be part of your program to boost protein levels, but choose the right mixture for your farm. Annual cut and wilt crops are also an excellent choice. Ask your local dealer for support in choosing a cropping system that will include crops that are both high in energy and protein. This does not mean that corn silage or forage sorghum should not be used. We suggest a balanced approach that includes highly digestible fiber crops and good protein forming a high forage ration that that makes milk or beef.

Choosing Your Cropping Program:

We have access to numerous plant species from around the world that have been identified and bred for forage use. The options are numerous, but the specifics determine which options are better fits. Weather, soils, crop rotation, technology, economics, harvest system, storage system, and livestock nutritional needs all have major impacts on which forage species are most appropriate for your farm.

Major questions to consider in making forage choices.

- *Is the crop adapted to your farms' soils and expected weather?*
- *Do the planting and harvest dates work for your farm?*
- *How will the crop impact crop rotation and total farm productivity?*
- *Do you have adequate storage capacity?*
- *What nutritional value does the crop bring to the ration?*

Balanced Energy and Protein Crops – These crops are cut and wilt just prior to flag leaf. Small grains, annual and Italian ryegrass, perennial grasses and many mixtures are included. The timing of the harvest needs to be aggressive to ensure excellent fiber digestibility and good protein. This type of forage is more balanced to the cow's needs, as energy through fiber digestibility is high and protein content is close to the cow's needs. If grown and made properly, these feeds are typically around 16% protein; NDFd 30 around 70%; and Kd rates around 6.

Below are major forages that are excellent choices for lower protein costs and if the legumes are mixed with grasses also increase the energy from forages in the form of high fiber digestibility and/or sugar. Do research before seeding, including herbicide crop rotation restrictions, prior to making decisions.

Summer Forages – Seed in spring and harvest in summer.

- BMR Forage Sorghum harvested at flag leaf – High forage yield in about two months. High fiber digestibility and moderate protein. Excellent component of double and triple cropping programs. Very water efficient.
- BMR Sudangrass – A multi-cut and wilt crop that is easier to dry. Has moderate protein and high fiber digestibility. Very water efficient.
- BMR Sorghum sudan crosses – A multi-cut and wilt crop with high fiber digestibility and moderate protein. Very water efficient.
- Millet- A multi-cut and wilt crop that is easier to dry. Has moderate protein and high fiber digestibility.

Winter Forages – Seed in late summer to early fall and harvest in spring.

- Small Grains harvested at flag leaf – These crops have high fiber digestibility and moderate protein content. The harvest window is different for each crop. Triticale, Rye, Wheat, Barley and Spelt
- -Annual and Italian Ryegrasses – These crops are low in cost but high in forage quality and soil building attributes. Can be harvested up to three times in the spring. High fiber digestibility and moderate protein content. From an agronomic perspective these ryegrasses increase soil organic matter more than the

other winter annuals. Annual ryegrass can also break up compacted soil layers over time. The increased soil health improves yields of summer annual crops used in rotation. Ideal to mix with small grains and crimson clover.

- Crimson Clover – This winter annual legume can be seeded with triticale, wheat and ryegrass very successfully and will increase the protein content of the forage.
- Winter Peas – A newer high protein crop to our area that is still being researched. Newer varieties have improved winterhardiness. Mixing with a small grain is desirable in improving winter hardiness. Seed during barley to early wheat dates.

Mixtures of the Above

Cool Season Forages – Seed in early spring or late summer and harvest in about 60 days.

- Spring Oats and Barley – Note: There are a lot of differences in these products by species and variety. As a general rule they will feed similar to winter small grains.
- Spring Peas – Seed with the small grains to increase protein content by about two points. Peas will also dry on the slower side.

Perennials – Seed in March or August and harvest several cuts per year for a few years. We prefer mixing the grasses and legumes to provide more productivity and balance energy and protein.

- Alfalfa – A drought tolerant high protein cut and wilt crop.
- Clovers – Red Clover has high protein quality that is more stable than protein from alfalfa during fermentation. White clover and ladino clover have high protein and fiber digestibility, as less stem is harvested. (The stem, a stolon, runs on the soil surface).
- Various grasses – Superb quality if harvested prior to heading. If mixing with legumes, choose species and varieties that mature with the legume crop. European breeders have made dramatic improvements in perennial grasses and the differences in products can be dramatic.

Hay in a Day Really Works!

After many years of working with Hay in A Day systems, we are hearing great feedback from forage producers across the east! Based around wide-swathing, this concept increases forage quality by decreasing drying time. The key is to lay the forage out wide, no less than 80% of the total cut width. This increases the forages surface area and exposure to sunlight, decreases the continued respiration, preserves sugars and maintains overall quality. For more information on Hay in A Day or Wide-Swathing contact your local King's consultant or visit us at KingsAgriSeeds.com.

Proper width for wide swathing.
Almost full width of the mower.

The Fastest Gun in the East- Spring Forages

Spring forages can provide high yields of quality feed in a short period of time. Most importantly, they allow you to have an active, growing stand of solar collectors to harvest those early season warm and sunny days. Producing high forage yield requires high fertility, especially in the case of spring forages. They quickly uptake the nutrients for rapid growth and high yields. The potential for 2-3 tons of dry matter harvested from a spring forage can be a reality with the right conditions. However, lower fertility ground will not reliably produce these yields. You get out what you put in.

Take a look at these quick-draw forages that produce high yields of top quality forage in a short time.

Everleaf Forage Oats- Our most popular forage oat and for good reason. With leaf width potential at 1.25 inches, Everleaf is a highly digestible oat that stays leafy longer. Roughly 65-70 Days to Boot Stage.

CDC Haymaker Oats- NEW wide-leaf Canadian type with great yield. High forage quality. Roughly 60-65 Days to Boot Stage.

ProLeaf 234 Oats- Leafy, medium maturity forage oats with strong yield and quality. Earlier than Everleaf and CDC Haymaker. Roughly 55-65 Days to Boot Stage.

Reeves Oats- Leafy, early maturing forage oats that is taller statured. Great yield and quality. Roughly 45-55 Days to Boot Stage.

Pea Oat Mix- 50/50 Blend of Spring Peas and Proleaf 234 Forage Oats. When harvesting peas and oats with the oats at boot stage, expect about 1-2% increase in protein. Time harvest with the maturity of the oats.

AC Kings Spring Barley- A strong two row barley that has shown great early season vigor and spring forage yield. This variety can be used for both forage and grain. Roughly 45-55 Days to Boot Stage.

Wide leaves and high leaf to stem ratio characterize our forage oats. Everleaf specifically has leaves that can

Green Spirit Italian Ryegrass

Green Spirit is an extremely productive blend of diploid and tetraploid Italian ryegrasses. Tetraploid varieties provide high dry matter production, disease resistance to crown rust and improved palatability. Diploid varieties are added for better persistence under grazing and improved traffic tolerance.

In regions with moderate climates, Green Spirit will be a biannual forage and will be very productive throughout the entire season unless drought occurs.

The varieties used in Green Spirit require prolonged periods of cold weather for vernalization. Once vernalized the plant has the ability to produce seed heads which can result in the loss of forage quality. Inferior products that imitate Green Spirit vernalize with much shorter periods of cold, producing seed heads soon after planting, when spring night time temperatures drop.

Spring Green-Up Fertility– Coming Soon!

Dave Wilson, King's Research Agronomist

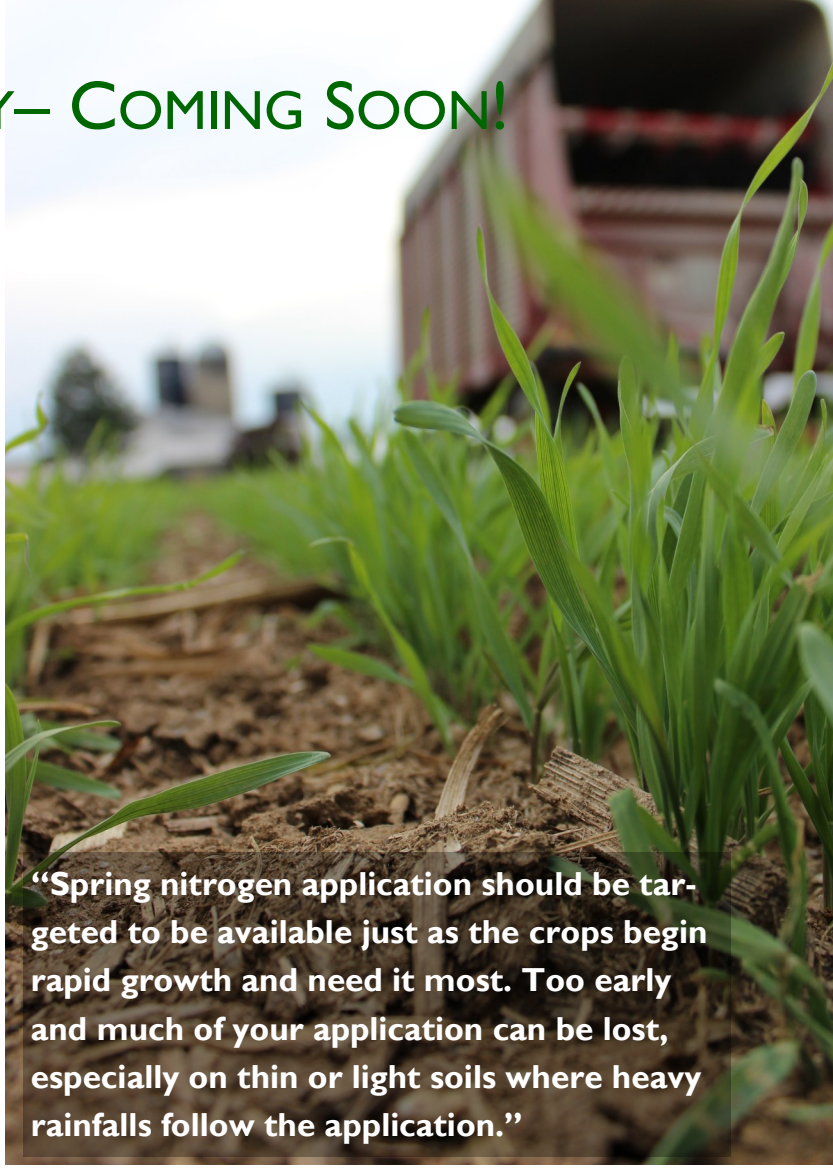
As soils warm in the spring, rising temperatures signal the crowns of winter annuals and perennials to break winter dormancy, and they begin a period of rapid, temperature-responsive growth, a process known as "spring green-up". Along with that flush of growth comes the need for large amounts of readily available nutrients. When properly managed, winter annual small grains can grow 2-4 tons of additional dry matter in the short time between green-up and the time of forage harvest. Our perennial grasses can produce 1 to 3 tons of dry matter by first cutting, which typically occurs a few weeks after the time that we are harvesting the small grain forages.

It's generally advisable to add the bulk of your nutrients in spring. With small grains, a fall application of some nitrogen, or having some nitrogen available from manure sources in fall is beneficial for tiller development which ultimately can lead to heavier yields in the spring. However, too much fall nitrogen causes excessive fall growth; greater than 6 inches of growth before winter can leave the crop vulnerable to winter damage.

Supplying enough spring N – 70 to 100 lbs/Acre, depending on the previous crop and history of manure in the field – can help increase crude protein content of the forage up to 20% of dry matter if it is harvested at flag leaf stage. (But be careful with too much N – a CP over 20% in small grain forages may signal high nitrates, a health hazard to animals.)

Spring nitrogen application should be targeted to be available just as the crops begin rapid growth and need it most. Too early and much of your application can be lost, especially on thin or light soils where heavy rainfalls follow the application. Liquid fertilizer applied right at green-up will be more readily available and effective than dry fertilizers, but at most locations spring rains are adequate to dissolve and move dry fertilizers into the root zone.

In high rainfall areas or on lighter, sandy, shaley soil where there is high leaching potential, you may need to split your spring nitrogen application so it is more efficiently drawn by the crop.



"Spring nitrogen application should be targeted to be available just as the crops begin rapid growth and need it most. Too early and much of your application can be lost, especially on thin or light soils where heavy rainfalls follow the application."

De-Hardening

"De-hardening" begins when small grain crown tissue gets the signal to break dormancy as the plant's crown reaches a temperature of 45-48 degrees F. From here, N application supports tiller growth and more vegetative growth. Growth rate increases the more temperatures rise.

Spring tillering and growth depends not only on proper fertilization, but also proper timing of fall planting. Late-planted forages won't tiller as much in the spring, and those that were planted too early likely grew too much in the fall and possibly suffered more winter injury and die-back, reducing spring resiliency.

Making Up the Deficit Now

The available N portion of any fall manure application depends on the type of manure (dairy, poultry, swine), as well as the consistency (solid, semi-solid, liquid). Manure is a valuable nutrient resource but there are huge variations

in the manure from different livestock and also in different handling and storage systems. Periodic manure analysis is recommended for more accurate insight to manage manure nutrients. In manure with a higher straw or solid bedding contents, the carbon to nitrogen (C:N) ratio will be higher, tying up N and making it less readily available. Mineralization of organic N compounds is temperature-dependent, and a good percentage of it is released after temperatures have warmed and the winter-annual forage crop has already been harvested. This means that you need to compensate at green-up time or just before, with N that will be available at green-up and shortly thereafter. Ammonium sulfate is ideal at green-up time because it contains both nitrogen and sulfur, both critical for protein synthesis. Sulfur is also important for efficient nitrogen uptake and use. Like a nitrogen deficiency, sulfur deficiency can manifest as chlorosis, or leaf yellowing.

Before coal-burning plants adapted smokestack scrubbers to clean emissions, much more sulfur was deposited into soil through acid rain. Soil sulfur levels have consequently been on the decline, and more rapidly in fields in which forage is grown than grain (as more of the plant – and more nutrients - are removed in a forage crop).

Other nutrients

Soil types with a low CEC (Cation Exchange Capacity) – lighter, sandier soils – don't hold onto and store high levels of nutrients like potassium and magnesium as well as higher CEC type soils. In these type soils, deficiencies may develop more quickly. An addition of K-Mag (Potassium and Magnesium) or a Sul-Po Mag (Sulfur, Potassium and Magnesium) type fertilizer combinations at greenup can be a good addition in soils that are low in these nutrients. High CEC soils are often heavier, higher in organic matter, and often don't show the same deficiencies as quickly as lighter soils. Regular soil testing can give you an accurate picture of what soil nutrients are being drawn down over time and which are needed.

Manganese deficiencies present symptoms that resemble winter injury or windburn. Winter barley is among the more susceptible crops to this deficiency. If a spring N application stimulates rapid growth in the presence of a manganese deficiency, plants may suffer severe damages.

A soil pH of 6.5-6.8 should also be carefully maintained and monitored, again through periodic soil tests, as nutrients are most available within this range.

What About Perennials?

Pastures and hayfields of course experience a green-up period of growth in the spring as well, in which they need certain levels of available nutrients to push rapid growth in response to rising spring temperatures. Usually these fields are amended in the late summer or fall, and the established root system has taken up and stored much of the energy and nutrients it needs to begin spring growth. It is of course important to push growth, but you may only need 30-40 units of N at green up time, depending on the perennial species composition, with the higher yielding orchardgrass and tall fescue varieties utilizing more. Perennials typically don't produce quite as much dry matter in the first cutting as winter annual small grain forages. They don't have the same race to put on the majority of their growth and reach reproduction in those spring months as do the winter annuals, so the nutrient load should be matched to productivity accordingly. Also, perennial grasses are often growing a few weeks longer and later into the season before first cutting, and at this time the soil temperatures continue to rise and organic compounds begin to mineralize, which will liberate some nitrogen and other nutrients for the growing perennial grasses to utilize.

Late summer is usually the best time to soil test and amend pastures and hayfields for various deficiencies.

THE STORY OF KINGFISHER ALFALFAS

Genevieve Slocum, Kings Research & Marketing Support

Which alfalfa fits in your field? Start by considering basic attributes that vary from one alfalfa to the next. These include yield potential, fall dormancy, winter hardiness, forage quality, stand persistence, and pest and disease resistance, to name a few. King's AgriSeeds stands behind each of our KingFisher varieties. Each of our varieties also have unique characteristics which can further help clarify your best choice. Unsure of which alfalfa is best? Ask your local King's consultant.

525 - THE MULTIFOLIATE

Robust multifoliate alfalfa with excellent quality and winter survival ratings. Multifoliate refers to leaves with greater than 3 leaflets. Multifoliate alfalfas have the potential to be higher yielding and of higher feed quality than trifoliate type. 525 is well-adapted from North Carolina to New York. It is highly disease resistant, and has an extended growing season. Digestibility is also improved. Early seedling growth, spring vigor, and drought stress tolerance are all excellent.

ENHANCER II - THE WORKHORSE

Top yielder with excellent feed quality. Enhancer II has a very fast recovery after cutting and a medium-fine stem. Leafiness, or leaf-to-stem ratio, is exceptional. It also has good tolerance of wheel traffic. Stand persistence is excellent.

PLH 322 - THE LEAF HOPPER RESISTANT

Leaf hopper resistant variety with exceptional quality and winter survival. PLH 322 is ideal for organic and transitioning areas where no pesticides can be used. Fine hairs on the stems deter this common alfalfa pest. It maintains high forage quality in a delayed harvest setting, and has high multi-foliate expression and winter-hardiness.

PROFUSION HX - THE HYBRID

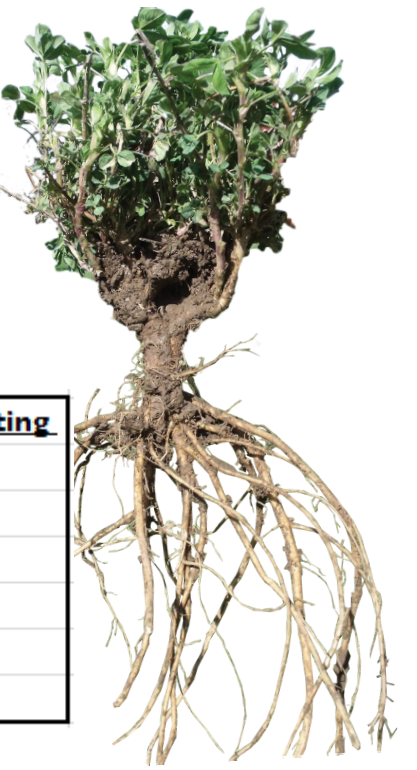
Aggressive hybrid that delivers density and yield with very fine stems. Profusion tolerates drier soils well. The fine stem makes for quick drying and a dense, attractive bale, as well as a tighter pack in bunker silos. Drought tolerance, disease resistance, and an extended harvest window are also key features. Profusion offers the potential of both high yield and top quality if managed on an aggressive cutting schedule.

SECURE BR - THE BRANCH ROOT

Distinct branch rooted alfalfa with a strong disease package. Secure has a high tolerance for wet conditions is high, including resistance to the pathogens that inhabit wet soils. In addition to maintaining a portion of the root system above the water table, the branch roots anchor the plant and protect against winter freezing and thawing conditions that result in heaving. SEE PICTURE BELOW

TRAFFIC PRO - THE SUNKEN CROWN

Deep set crowned alfalfa that is resistant to traffic stress. A deep set crown helps protect the plant from wheel and animal damage, which makes it a preferable alfalfa to use in grazing mixes or in areas where high wheel traffic may occur.



Variety	Fall Dormancy	Winter Hardiness	Disease Rating
525	5	2	34/35
Enhancer II	4	1.6	30/30
PLH 322	3	2.2	30/30
Profusion HX	4	1.6	30/30
Secure BR	3.8	1.6	34/35
Traffic Pro	3.7	1.5	34/35

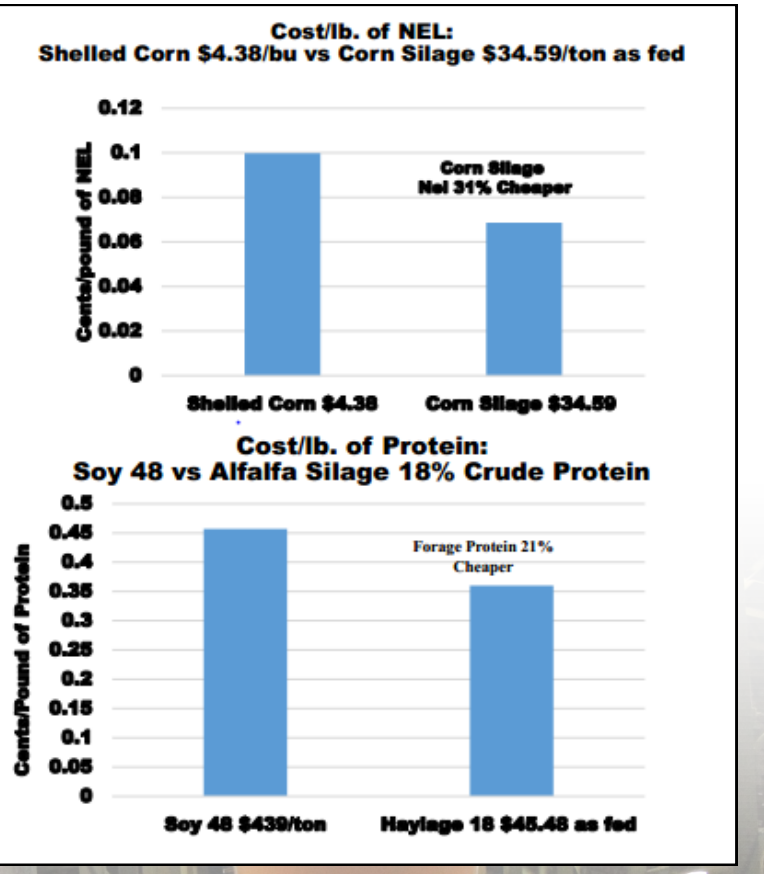
Steps to High Forage Diets, and Why

Tom Kilcer, Advanced Ag Systems, Kinderhook, NY

As the forecasts for milk price continue to slide, dairy farmers are justifiably concerned for their bottom line. The shock is magnified having just come off of very good prices. Yes, grain prices have also slid but not as much as milk is forecasted. I saw this similar setup in the early 1980's and it was not pretty.

Fortunately, we have more information now that can help farms weather the down turns and pay down debt in the upturns. A key has been to feed cows as cows. They are forage digesters and the more that is included, the greater the benefit. On farms we worked with they saw increased components as they switched to higher forage, so they got more money for their milk. Reduced culling meant fewer heifers needed to be carried to maintain herd numbers. Dr. Chase of Cornell in a study of high forage farms also found less metabolic disorders and acidosis. This meant fewer foot problems and lower vet costs. The lower vet cost was a striking factor in the farms with which we worked. Dr. Chase and our work found that there was a significant increase in income over feed costs. In other words the bottom line got better! A group of farms for which high forage diets are critical are the organic dairies. Their grain costs are tremendously high. **Substituting high quality forage can meet the animal's needs for high production without sending so much of your milk check to someone else.**

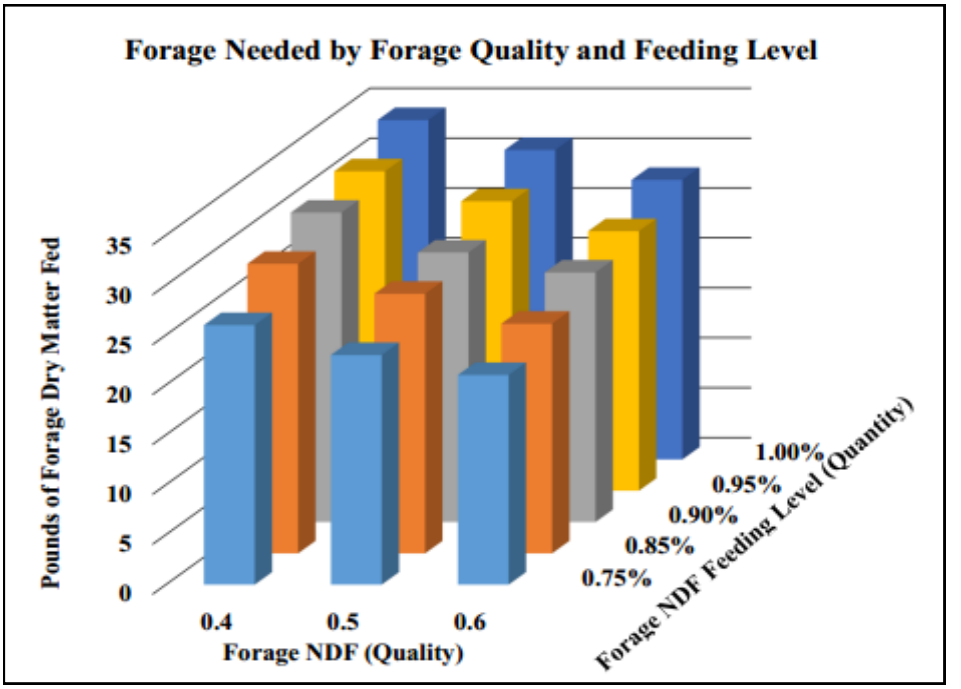
Over the past two decades, I have repeatedly looked at the cost of nutrients from purchased concentrate vs that from a well-run forage crop program. The numbers on the graphs may change, but the relative positions do not change. A well managed quality forage will produce energy and protein to meet the dairy animals' needs for high production at 20 – 30% lower cost than the same nutrients from concentrate, as you can see in the graphs below.

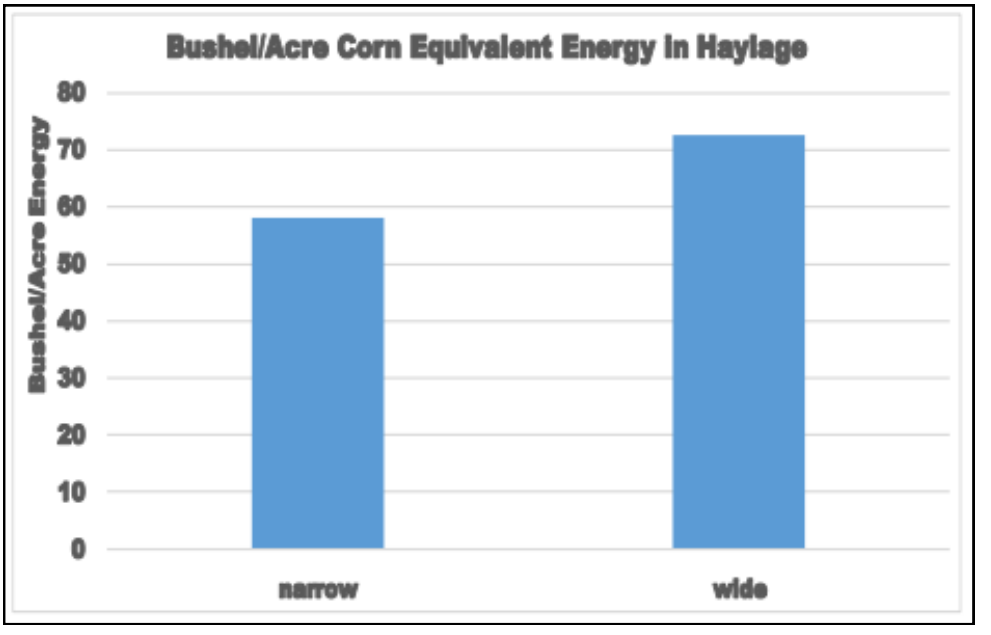


High forage diets are not a silver bullet to cure all ills, but rather a mindset and a process that can only be achieved over time. For some farms, the transition takes 3 to 4 years.

Before you can even consider moving to a high forage diet you first have to produce high quality forage, at an economic cost, over a range of weather conditions and time. The critical part is the crop rotation used on each of your fields (it could be different for each field). It may be a shock to a few nutritionists, but the soils drive the rotation, which drives what the cows are fed – it is not the nutritionist. You have to grow quality forage that is best adapted to your soil and environment. This is why we are actively researching the best management practices for crops that produce very high quality forage such as winter triticale forage and red clover, as well as double cropping short season BMR sorghum forages or short season corns with highly digestible kernels. Each have the ability to support high forage diets, but are adapted to soils/environments where alfalfa and /or corn may not do as well. As you take steps to increase forage quality (nearly all steps are in your management, not something you buy), the cows will start eating more. As you work with your nutritionist to increase the forage feeding levels, the cows will eat more. Combine the two factors and a moderately low forage quality diet fed at a typical low forage feeding level when transitioned to a high forage diet of high forage quality, can increase forage consumption by 32% (graph at right). It may seem common sense, but you have to produce it before you feed it. Farmers are often shocked to see how fast the end of the forage supply comes when feeding a high forage diet.

Critical to all of this is the job you do in getting forage quality to the mouth of the cow (the only place it counts). Growing appropriate maturity corn varieties will allow it to be harvested at optimum quality instead of waiting a month after everyone started before you can chop wet butyric stuff. That promised extra yield is not worth it. Harvesting haylage by wide swath same day practices can increase the energy level of your alfalfa 25% to nearly that of corn silages. This supports much higher milk production from your haylage. Both of these factors -corn silage maturity and haylage harvest- are factors you control in your journey to high forage feeding.





"Grass" vs. Quality Forage Systems– Finishing Beef

Joshua Baker, Kings AgriSeeds Marketing Manager/Southern Region Coordinator

Ask 100 people **"What is grass finished beef?"** and you will most likely get 20 different answers. The respondents may be thinking of an off flavored, tough cut from 26 month old animal, or they may be thinking of a juicy, well-marbled cut from an18 month old animal. They may picture their neighbor down the road who traps in his free-range cattle every other year and markets grass finished beef, or they may think of the 1,000 head managed intensive grazing operation. At a conference recently I heard this broad spectrum of opinions from a host of livestock producers. At this same conference a well prepared presentation was provided that pooled numbers from various sources and drew conclusions by comparing grass-finished and grain-finished operations.

As talked with producers and listened to the presentation, a recurring question came to mind: "What is grass?" If the desire is to produce a grass finished animal, harvested at 26 months with marginal quality, then "grass" may be K-31 fescue in the spring and fall, with supplemented hay in the summer and winter. On the flip side of that, with the goal being to produce a quality product, harvested at 18 months, "grass" has a whole different meaning. With the latter, "grass" should be defined as energy-dense, highly digestible annual and perennial forages. "Grass" must be analyzed for quality and expected to provide the nutrients required for aggressive daily gain. **Check out pages 14 and 52 of our Product Information Guide for more info on comparing grass quality.**

In addition to focusing on the quality of grasses produced, if the goal is to produce a quality product, harvested at 18 months, the production system must include a mixture of perennials and annuals. The goal here is to combine multiple species, and the highest quality varieties within those species, into a forage crop rotation that maximizes your land productivity and finishes the animal rapidly. Forages should be harvested or grazed in a timely manner at a vegetative state to ensure aggressive gains and finish animals fast. Most of all, they should be managed as an investment, with time spent analyzing soil quality, tailoring forages for specific land-bases, evaluating management practices, etc.

In our 2015 Calendar I highlighted an operation that utilizes both a combination of high quality forages and aggressive forage rotations to finish beef. Pictured in the bottom right is an animals that is 17 months old, pushing 1200 lbs.

If the intent of your operation is to finish a high quality beef product, ask a few questions-

How does the quality of the grass used affect my finished product?

Is my forage production system intentional, timely, and frequently evaluated?

How can I make improvements to my forage production system that increase product quality, land productivity and overall profitability of my operation?

For more information about aggressive forage production systems with high quality forages, check out pages 50-52 and 57-58 in our 2015 Product Information Guide. As always, feel free to contact a King's Representative or your local King's dealer.

A Virtual Visit @ KingsAgriSeeds.com

Home Page: At the top, you can find special company updates, such as our Winter Grow More Forage Meetings. On the right side; a search box where you can use key words to find content throughout the site; a link to download our Product Guide; featured press about King's AgriSeeds and a sign up form where visitors can easily add themselves to our e-mail list; a link to our online promotional products store. Links to our social media pages are at the bottom right-hand corner.

At the bottom of the homepage, an events ticker displays upcoming events that are clickable for more information.

Products: With each product description is a link to a downloadable tech sheet for more specific information.

Forage Technical Reference: This page is our collection of go-to reference material on many subjects, and the goal is to help you answer the in-depth questions that come up when using our products. While our crop tech sheets provide specific information by crop, these fact sheets go a step further to answer questions about management and crop and soil science.

Crop Data: A searchable database of research plot data for many of our products. Use the filters to search by crop, year, and location, and you can download the PDF documents that showcase different varieties of your crop of interest. This data comes from both King's Research Department and third party university studies, and includes yield data as well as quality numbers.

Resources: Under this dropdown menu are more tools. Our blog, also its own tab at the top, is a wealth of articles written by staff and guest contributors about agronomic, crop, and management considerations that come up, usually as we are out observing research plots or fielding questions from our customers.

"Farm Planning Tools and Calculators" is a list of hands-on, interactive tools compiled from many extension services that help with various aspects of planning your operation.

Also under this tab, "Newsletters" is an archive of our quarterly newsletters, aimed to educate our customers about the most timely topics for the season. "Supported Organizations" provides a state-by-state directory of companies and groups designed to provide additional regional assistance to livestock producers.

Keys to Successful Frost Seeding

Field Selection: The field must have enough room for additional plants, and crop residue must be short enough to leave soil exposed.

Pastures: Graze down hard prior to seeding. Double check crop rotation restrictions if residual herbicides were applied within the last 24 months.

Timing: Ice and hard snow should be absent. Best timing is when soil is frozen in the morning and thawing during the day. Seed while soil is still frozen.

Method: Broadcasting with a spinner, Herd seeder, etc. Can use a seed drill but drop seed on top of the ground.

Species: The species used for frost seeding is an important factor. Species that are best adapted to frost seeding include all of the clovers, with red clover being the quickest to start. For pastures, we recommend our Premium Clover Blend.Grasses that can work include: ryegrasses and ryegrass-type festuloliums. Seeds with a low probability of success include alfalfa and most other grasses.

Here's What They Say...

Planting the short season Alta sorghum (AF7201) behind a short season Masters Choice Corn (MC 5250) gives more yield than planting a full season corn alone. You can plan on more consistent tonnage year after year than a full season corn on the same ground.

Jack Fritz, Owner/Manager
Fritzglen Farm
300 Cow Dairy in Springfield, TN

"I had heard of Masters Choice corn and after seeing results from test plots decided to try some in 2014. I grew approximately 125 acres and was very impressed. It was tall, beefy corn with big stalks and excellent standability averaging 27 tons per acre. It was consistently one of the highest yielding corns on our farm, outyielding our BMR corn by almost 13%. Yields were the same as some of the competitor's leafy conventional corns but with better digestibilities, comparable to our BMR corn. Even on different soil types the Masters Choice performed very well with high yields. This year over 500 of our 1500 acres of silage corn will be Masters Choice. We are very happy with our decision to plant Masters Choice."

Luke Huysman, Partner in Barbland Dairy LLC
2014 National Dairy Shrine Graduate Production Award Winner
1700 Cow Dairy in Fabius, New York

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High Energy Forages and Soil Building Cover Crops

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