King's AgriSeeds Inc.
60 N. Ronks Rd.
Suite K
Ronks, PA 17572
(717) 687-6224
High Energy Forages and Soil Building Cover Crops

Which alternative forage source is right for you?

Tim Fritz, King's AgriSeeds, Inc. Forage Agronomist and President

Affordable high quality forages are one of the key factors for success on a dairy farm. Quality can be thought of in various ways. Energy from derived from Neutral Detergent Fiber (NDF) and Non-Structural Carbohydrate (NSC), protein and effective fiber are major talking points on forage quality. The dairy industry is continuing to improve its understanding of how to test and balance rations that are based on high quality forages. The reality is that if the ration is put together properly just about any quality forage can be fed to high producing livestock. But what are quality forages and what makes quality alternative forage? Prior to 1960, corn silage and alfalfa would have been classified as alternative forages as main stream forages at that time were grass-clover mixtures. 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 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.

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

Most forage crops can be placed into three major categories:

Energy Crops – These crops develop starch and are close to full maturity when harvested. They are typically low in protein and have lower fiber digestibility. Examples include: Corn silage, soft dough forage sorghum and soft dough small grains.

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. 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 processed properly these feeds are typically around 16% protein with a NDFd 30 close to 70% and Kd rates of around 6.

Protein Crops – These crops are generally legumes with very little grass, harvested close to bud stage. Crops include alfalfa, red clover, white clover, crimson clover, peas, and cowpeas. Protein content is typically in the low 20's but digestible fiber is lower depending on the species.

Below are major forages that can be used to develop a balanced forage system for your farm. Do research before seeding, including herbicide crop rotation restrictions prior to making decisions. Walk before you run by planting limited acreage the first year. A balanced crop rotation using a few of these crops can reduce your forage risk and increase farm productivity dramatically.

Summer Forages – Seed in spring and harvest in summer.

- Corn Silage – Highest starch forage with high yield product on productive soils
- BMR Forage Sorghum harvested at soft dough – Best used on droughty soils and is high starch and sugar. Very water efficient.
- 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 – Multicut and wilt crop that is easier to dry. Has moderate protein and high fiber digestibility. Very water efficient.
- BMR Sorghum sudan crosses - Multicut and wilt crop with high fiber digestibility and moderate protein. Very water efficient.
- Millet- Multicut and wilt crop that is easier to dry. Has moderate protein and high fiber digestibility.
- Cowpeas – A summer legume crop that can be mixed with forage sorghum to be harvested at flag leaf. Increases protein content and has improved fiber digestibility over soybeans.

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. Harvest window is different for each crop.
    - Triticale, Rye, Wheat, Barley and Spelt
- Small Grains harvested at soft dough – Has moderate levels of starch but fiber digestibility and protein are relatively low.
    - Barley is most suited for this harvest method and is in closer quality compared to corn silage compared to other species.

- Annual and Italian Ryegrasses – This crop is a low cost but high forage quality. 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 protein content of the forage.
- Hairy Vetch – This winter annual is not typically used a forage but is planted as a cover crop frequently to increase nitrogen in the soil. For a forage, it is best mixed with wheat or spelt as it is slower to come to bud stage.
- 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 March (early spring) or August (late summer) and harvest in about 60 days.

- Spring Oats, Barley, Triticale – Note: These products vary greatly 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.
- Mixtures of the above.

Perennials – Seed in March (early spring) or August (late summer) and harvest several cuts per year for a few years.

- Alfalfa – A drought tolerant high protein cut and wilt crop.
- Clovers – High protein quality that is more stable than protein from alfalfa during fermentation.
- 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 perennials grasses and the differences in products can be dramatic.

More information on specific details of forage crops can be found in the Penn State Agronomy Guide and related fact sheets. King's AgriSeeds website at www.kingsagriseeds.com and our Product Information Guide is also a strong source for information on both management and product details.

How to start incorporating alternative forages into your rotation

Below are a few examples of where to start adding forage diversity to your farm depending on your starting point. We suggest just making one change per year and start in limited acreage until confidence in growing, harvesting, storing and feeding is gained.

Example Farm 1. Corn silage and alfalfa on productive soils.

Suggested addition:

Add a double crop small grain such as rye or triticale. Typically this crop is planted after corn silage harvest but could also be no-tilled into thinning alfalfa stands. Corn planting is typically delayed be using the winter annual small grain. The small grain also acts as a cover crop. The corn hybrid used can be shorted in maturity by a week or so and the overall yield and quality harvested from the farm typically increases. When feeding, add all three crops to the dairy ration if properly made.

Example Farm 2. Corn silage and small grains on droughty soils.

Suggested addition:

Replace part of the corn silage acreage with BMR forage sorghum. This will reduce drought risk and lower forage costs. When feeding, add all three crops to the dairy ration if properly made.

Example Farm 3. Corn silage and grass clover hay on wetter soils with a cooler climate.

Suggested addition:

Break continuous corn acres with a spring seeding of Italian Ryegrass. This crop will stay vegetative and very productive. If weather does not get hot and dry, Italian Ryegrass will make a cutting every 30 days or so. The fiber digestibility and protein levels will be excellent. Requires crop fertility but will reap dramatic rewards. The following corn crop typically will increase productivity due to improved soil organic matter and health from the ryegrass root system.