



**SOUTHERN
STATES®**

FORAGE GUIDE



WELCOME *to the* FORAGE GUIDE



Forage is the most important element to any diet, whether livestock or horses. This guide is intended to lead you, the livestock or horse owner, in the right direction when selecting quality hays and grasses. We've also provided information that will assist you in growing your own hay. Based on the area that you live in, different types of forages will be grown due to soil make-up and climate.

Southern States® is committed to providing quality nutrition for our customers' livestock and horses in order to maximize their health and performance. We hope that this Forage Guide will be a good resource in planning the diet rations for your animals.

A high quality pasture not only supplies your livestock and horses with good forage, it provides them with a natural and healthy environment for exercise and rest. It also helps you control feed costs.

Fall is the best time to plant, fertilize and lime a cool-season pasture. Late spring and early summer are the best times for a warm-season pasture. The proper timing for establishment is very important in developing the proper root system for providing the best forage for your livestock and horses over the growing season.

Once a pasture is established with a strong root system, it ultimately means less reseeding and rebuilding in the future. In other words, less work for you.

HEALTHY PASTURES BEGIN WITH SOUTHERN STATES®

Southern States® products and services can help you grow a healthier, more nutrient-rich pasture, because our employees are thoroughly trained with the agronomic skills necessary for pasture management.

From soil testing to seed mixes, to optimum spray protectants to fencing, Southern States is the supplier of choice when it comes to pasture management.



INTRODUCTION *to* FORAGES



SOIL TESTING:

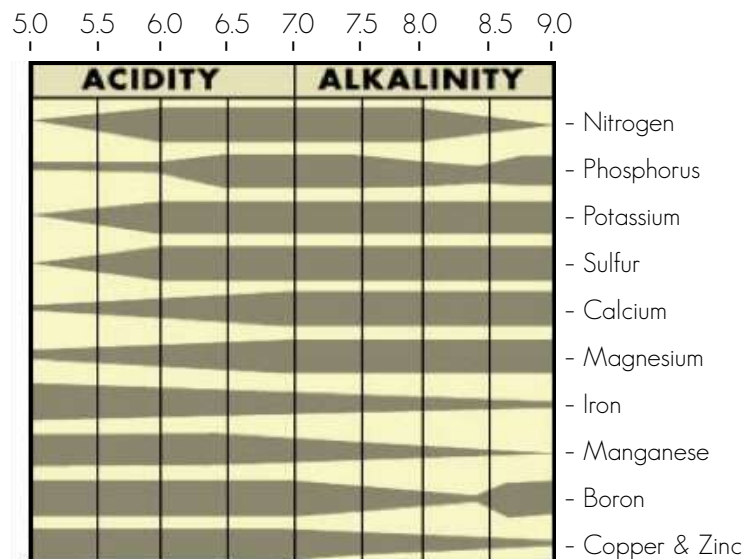
To optimize the effects of management inputs and efforts, it's essential to know the pH and what nutrient levels are present in your soil. A soil test will reveal any gaps that need to be filled so that your forage will grow properly. The key to soil sampling is to ensure a representative sample is obtained and submitted. Several samples taken in a given area will give more accurate results. These samples should be taken in a zig-zag or random pattern and at a depth of 4-6 inches on pasture and hay fields. Initial soil test prior to new plantings should be done several months ahead of time to ensure soil deficiencies can be found and corrected before planting. On existing forage stands soil tests should be done every 2-3 years on pastures and 1-2 years on hay fields. Soil test instructions and supplies are available from your local Southern States dealer. The test results generally take seven to ten days.

SOIL pH:

Soil pH is a measure of the acidity or alkalinity of a soil. It is based on a scale from 0 to 14 with zero being extremely acidic and 14 being extremely alkali. As reference, vinegar has a pH of about 3, milk of magnesia has a pH of about 10.5 and pure water is pH 7. Most plants can survive in a soil pH range of about 5 to 9. The optimum soil pH range for most plants is 6 to 7.

Proper pH is critical since it affects the way fertilizer is utilized by the plants. The pH of the soil determines how available nutrients are to the plant. At extremes of pH, vital soil nutrients become unavailable to plants which means the plant cannot get the nutrients it needs from the soil. Between pH 6.0-7.0 most nutrients are available to most plants. Many weed species can thrive in soil with pH levels outside the "optimum" range. This is one of the primary reasons that weeds take over fields where the soil pH is too high or low.

A more neutral pH is required to promote the health and productivity of most cultivated plants. There are some other problems for many plants at extreme pH. Some nutrients can become toxic because they are absorbed in excess by the plant. At low pH, even essential nutrients, like copper, can become toxic. Another common problem at low pH is aluminum toxicity. The best way to avoid these issues is to maintain a proper pH level. A high quality agricultural grade ground limestone should be used to raise pH levels to the proper 6.0 to 7.0 range. Dolomitic limestone is effective because it's safe and supplies essential calcium and magnesium. Your Southern States professional can help you design a program to properly balance soil pH for optimum fertilizer utilization.



FERTILITY:

Generally pastures will perform better if fertilizer is applied in two or three small applications rather than one large application. For instance, if the recommendation is for 120 pounds of nitrogen (N), two applications (45 to 60 days apart) of 60 pounds would be better for the pasture than a single 120 pound application. Three applications would be utilized even better but most folks settle for applying fertilizer twice a year.

On the fertilizer bag are three numbers that identify the percentage of 3 key nutrients in the bag. The first is nitrogen (N), the second is phosphorous (P) and the third is potassium (K). It is always in that order and they have to be on the bag. If you have large pastures, custom blending and bulk application are services offered at most locations. If you have smaller pastures, bagged fertilizer offered in many different analyses may be a better choice to help satisfy the soil sample recommendations.

As a general rule of thumb, nitrogen (N) helps the plants vegetative growth or the part we see and the animals graze. It is water soluble and will leach if we have a great deal of rain. Southern States offers a fertilizer treatment, NutriSphere-N®, which minimizes the leaching; you'll see it on some of our fertilizer bags as N-S-N in a small yellow circle. Phosphorous (P)

helps the forage develop a healthy root system and it doesn't leach or move very readily through the soil. That means that over time, you can build your P levels up to the point that you don't need to add any more (that's the benefit of the soil test!) so you can save some money on your fertilizer bill. Unfortunately, phosphorous can get bound on a molecular level with calcium, magnesium, iron or aluminum in the soil. On some of our fertilizers we offer a treatment called AVAIL® (also in a small yellow circle on the bag) that will prevent that binding so it will be readily available to the plants. Potassium (K) is used by the plant much like our bodies use vitamin C; it keeps the plant healthy. One of the critical roles that K performs is in the regulation of water moving in and out of the plant. When it turns hot and dry in the summer, the potassium works to maintain the moisture in the plant to keep it alive and healthy. The potassium can leach out of sandy soils very quickly but will move more slowly in the heavier clay soils.

Soil sample results will have a recommendation for a fertilizer application as well your local Southern States Agronomy professional to help interpret the results and make a recommendation.



INTRODUCTION *to* FORAGES

NUTRIENT REMOVAL:

Nutrients are removed from the soil as plants grow and when forages are harvested. In a grazing scenario approximately 70% of the nutrients are returned to the soil via animal waste so you lose around 30%. When harvested for hay, 100% of nutrients in the harvested forage are removed. Therefore the need for additional fertilizer in a hay application is greater than for a pasture. The chart below shows the units of primary nutrients that are used based on a removal rate of 1 ton (2000 lbs.) of dry mater per acre of a monoculture stand. On average a round roll of hay will weigh 800 lbs. so for every 2.5 rolls this is what analysis you are removing. A lot of times we see 15-15-15 or 19-19-19 used as a general fertilizer however it does not meet the demand of crops resulting in stand reduction or stand loss.

Pounds of Nutrient Removed for Each 2,000 of Forage Per Acre

	Alfalfa	Red Clover	Orchardgrass	Fescue	Bermudagrass	Ryegrass
Nitrogen	51	45	36	37	46	43
Phosphate	12	12	13	12	12	12
Potassium	49	42	54	54	50	43

These figures based on AgPhd fertilizer removal App.

ROTATIONAL/CONTROLLED GRAZING:

Rotational or controlled grazing is the practice of moving livestock between subdivided pastures called paddocks. This practice has many benefits including increased forage yield, improved forage quality, and enhanced pasture utilization and plant persistence along with improved nutrient recycling. The basic premise is on use and rest periods of forages. Paddocks are allowed approximately 30 days rest after hay is grazed.

Knowing when to remove animals is one of the keys to controlled grazing. For cool season grasses, do not graze below 3.5-4 inches. Consider the bottom 2-3 inches of the plant as the “energy bank” for plant regrowth. For warm season grasses do not graze below 2 inches.

Rotational/controlled grazing systems should be based on the forage and nutritional needs of the livestock and the forage quantity and quality available. Ask your local Southern States® professional if you need help getting started or making upgrades to your farm with specialty animal-safe fencing products. Southern States® carries a complete line of temporary and permanent fencing supplies to quickly and easily accomplish your grazing goals.



SEEDING METHODS:

Forage seeds can be planted using several different methods. The planting method should be based on land topography, soil conditions and available equipment. Below are brief descriptions on the common planting methods.

- **No-Till Drill:** this method is also a drop method where the seed is dispersed into tubes that fall behind coulters that open the ground and then are followed by a press wheel. This method can be used without preparation to the seed bed. It is the preferred method for level ground and sloping areas as it ensures good seed to soil contact and optimum seed placement. If a drill without the packing wheel is used then a culti-packer or roller should be used after drilling. Seeding depth is key to this method.
- **Drop Seeders:** this device drops the seed typically between two rollers that are compressing the soil. This method is only used when the seed bed has been prepared. Soil must be firmed with a culti-packer or roller prior to seeding if soil is extremely loose. This method usually results in excellent seed to soil contact and optimum seed placement.
- **Broadcast:** this method is seeding with a device that spreads seed by slinging the seed over the top of prepared soil. This is the most common method of seeding simply due to cost of equipment. Seeding rates are often increased due to the possibility of poor seed to soil contact and washing. Firming the seed bed prior to seeding by using a culti-packer or drag (Chain Harrow) will help firm the seed bed. Culti-pack or drag (Chain Harrow) the seed after planting to ensure good seed to soil contact.
- **Frost Seeding:** this is the method of broadcasting seeds into existing stands during late winter or early spring and allowing the thawing, freezing action of the soil to pull the seed into the soil. Frost seeding is generally done to add legumes such as clovers into existing grass stands. To achieve the best results graze or harvest forages tight to the ground so that there is not a lot of thatch to ensure the seed makes it to the soil to achieve proper seed to soil contact.

ESTABLISHMENT CONSIDERATIONS:

- If forage stands have thinned there are a few common reasons; fertility levels, pH or stocking rates. These issues should be considered when planning on reestablishing forages.
- Planting depth is a major component of stand establishment. Planting too deep will result in less than satisfactory stands or total failure. Refer to Southern States seed chart for proper planting depth.
- When establishing new stands competition can cause issues. It is ideal to establish grasses first and then add legumes the following season. This also allows the use of herbicides to manage most weed issues.

- Timing of seeding should be done at recommended times for your specific area. Planting at improper times will result in less than optimal results.
- Consider all herbicides that have been applied before seeding; most herbicides have replant times listed on the label. Seeding before these times will result in less than optimum results.
- It is critical to remove livestock from newly seeded areas and leave them off until the stand is successfully established. Adding livestock back too quickly will result in reduction or loss of stand.

GIVE YOUR PASTURE SEED EVERY POSSIBLE ADVANTAGE



Southern States[®] alfalfa, clover and orchardgrass varieties come with the ALL-VANTAGE[®] advanced seed coating system with AquaBond[®] and Nutri-Start[®].

- Improves water utilization/management
- Improves seed survivability
- Aids in germination and emergence
- Promotes early root growth
- Increases seed to soil contact

AquaBond:

- Can store over 200 times its weight in water
- Works by releasing a steady supply of water as the plants need it
- Non-toxic, safe and economical to use
- Maintains applied water in the root zone effectively increasing water use efficiency by up to 50%
- Can last several seasons in the soil

Nutri-Start:

- Manganese: involved in enzyme activity for photosynthesis, respiration and nitrogen metabolism
- Zinc: acts as a growth activator. It is also a necessary nutrient for chlorophyll synthesis and carbohydrate formation. Additionally, zinc plays an important role in enhancing a plant's natural defense systems against pathogens
- Iron: needed for formation of chlorophyll, and acts as a catalyst for making other nutrients function



WARM *and* COOL SEASON FORAGES

When making your decision, vigor and persistence are characteristics you want from your forage seed. Choose forages adapted to your climate and soil. High performance varieties will return many times over and provide your pasture with improved yield, longevity and disease resistance.

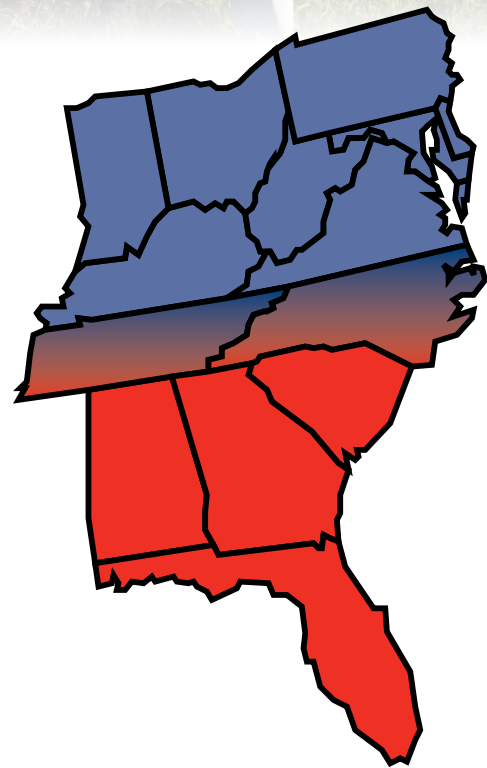


COOL-SEASON GRASSES

Cool-season grasses produce higher quality forage and grazing during fall and spring seasons with less productivity during the warmer months. These varieties do not tolerate extreme heat and drought. Orchardgrass, bluegrass, perennial ryegrass, timothy and low-endophyte and non-toxic endophyte tall fescue are good choices for Kentucky, West Virginia, Maryland, Delaware, Virginia and Western North Carolina. These grasses are perennials and function best when seeded in late summer and early fall.

WARM-SEASON GRASSES

Warm-season grasses produce higher quality forage and grazing during late spring through early fall with less or no productivity during the cooler months. Most varieties will go dormant after the first hard frost. For the cooler months, we recommend overseeding with annual ryegrass. Laredo Bermudagrass Blend is the best choice for a permanent pasture in our Southern territory – Eastern North Carolina, South Carolina, Georgia, Florida and Alabama. This grass functions best when seeded in the late spring and early summer.



 COOL-SEASON AREAS

 WARM-SEASON AREAS



SOUTHERN STATES® FORAGE TALL FESCUE

- Superior persistence under grazing pressure or hay production
- Low Endophyte (less than 5%) safe for all livestock
- Medium maturity
- Selected for soft leaf texture during drought/high temperature stress
- Excellent crown and stem rust resistance
- Greater late fall production than KY31 tall fescue

SS-0705TFSL is a low endophyte forage tall fescue variety. It has greatly reduced levels (less than 5%) of the endophyte fungus, which eliminates grazing animal health concerns associated with highly infected fescue cultivars like Kentucky 31. SS-0705TFSL is a medium maturity tall fescue that is an excellent choice for both hay and pasture applications. It was selected for soft, relaxed leaves improving the texture and feel to the livestock which increases palatability. Also being selected during drought and high temperature stress it maintains its palatability during these stressful periods. With excellent regrowth during summer stresses, SS-0705TFSL maximizes forage production for grazing. SS-0705TFSL has comparable yield and persistence under grazing pressure to the latest novel endophyte varieties on the market. It has performed well in hay and grazing tests at the University of Kentucky and private evaluation plots in Tennessee and Kentucky. SS-0705TFSL can be utilized in pure stands or in combination with legumes and other forage grasses. It is perfect for stockpiling as tall fescue maintains nutritive value late into the growing season and after frost better than other cool season grasses. Tall Fescue can successfully be grown on a wide range of soil types and tolerates pH from 4.7 to 9.5. Optimal production and feed value will be achieved in a neutral pH with proper fertilization.

DESCRIPTION

Forage tall fescue, *Festuca arundinacea* Shreb., is a long-lived, deep rooted, drought resistant, cool season perennial bunch grass. Many forage tall fescue plants produce extremely short rhizomes (underground stems) but it is difficult to distinguish plants established from rhizomes from simple growth of the crown. Two thirds of forage tall fescue growth occurs in the spring, but fall growth is excellent with summer production dependent on moisture availability and the amount of heat stress. Forage tall fescue can contain an endophyte which enhances plant health and performance. In its natural form, the endophyte can be detrimental to animal health. Be sure to plant varieties that have low endophyte (less than 5%) or contain a “friendly” endophyte.

USES

Forage tall fescue can be utilized as dry hay, pasture or ensilage. It can be planted either as a pure stand or, more commonly, in mixtures with other forage grasses and forage legumes. Because of its excellent fall growth and retention of quality, forage tall fescue is often stockpiled (not harvested in the fall) to be utilized as winter grazing.

ESTABLISHMENT

- Adjust soil pH to an optimum of 6-7. Tall fescue can tolerate a much wider range of soil pH but optimum pH allows for better establishment and seedling vigor.
- Soil type: prefers well drained soils but will tolerate varied soil types.
- Fertilizer: Proper levels of N, P and K are required. Refer to soil test. Micronutrients can be limiting at times and may need to be added.
- Seed bed: Fine, granular, and firm
- Seeding rate: 10 - 30 pounds/acre; in mixtures 5-15 lbs./acre
- Seeding time: (spring): February-April
(fall): August-October
- Seeding depth: ¼ to ½ inch

MANAGEMENT

- Do not harvest or graze tall fescue until well established.
- Can be grazed to a height of 3.5-4 inches but must be allowed to rest after each grazing period. Rotational grazing is best.
- Fertilize for optimum production based of the amount of forage removed and as recommended by soil test. Split fertilizer applications are best.
- Insects are generally not a concern.
- Rust may be an occasional problem that is dependent on seasonal environmental factors. Although rust is rarely fatal to the forage tall fescue plant, rust spores in large numbers may cause problems for horses. Improved forage tall fescue varieties have some but not complete resistance to rust.
- As forage tall fescue stands mature, legumes which may have been part of the original mixture may be choked out. Legumes may be re-established by adjusting soil fertility levels, doing some moderate ground preparation and seeding in the spring.
- Select varieties that have low (less than 5%) endophyte levels or contain a “friendly” endophyte.
- Be sure to plant low (less than 5%) endophyte forage tall fescue. Most turf tall fescues contains high levels of endophyte. Never use turf type tall fescue in place of forage tall fescue. Turfgrass clippings should never be fed to animals.



PERENNIAL FORAGE *Orchardgrass*



SOUTHERN STATES® ORCHARDGRASS

- Selected for survival and performance under severe drought conditions
- Maximum persistence for haying or grazing
- Superior forage yield
- Early-medium maturity, ideal for pasture and hay applications
- Improved foliar leaf disease resistance
- Excellent palatability

SS-0708OGDT is a new, early-medium maturity orchardgrass that is an excellent choice for pasture, hay or silage. It can be utilized in pure stands or in combination with legumes and other forage grasses.

SS-0708OGDT was selected for survival under severe drought which results in maximum persistence in the field.

Other characteristics include high forage yield potential, excellent forage quality, quick recovery after cutting and improved resistance to foliar leaf diseases.

DESCRIPTION

Orchardgrass, *Dactylis glomerata* L., is a deep rooted, fast growing, long-lived, cool season, perennial bunch grass. Because of its shade tolerance, it has been historically used as a ground cover in orchards, hence the name. Orchardgrass tolerates shading better than other grasses and has good winter hardiness when properly managed. Continuous production of vegetative tillers gives orchardgrass the ability to recover quickly after cutting. It has high forage quality in the early vegetative state with crude protein levels over 20% but quality decreases rapidly as the tillers mature. The characteristic “V” shape of the leaves and the flat leaf sheath found at the leaf base easily identifies orchardgrass.

USES

Orchardgrass may be used as pasture, hay or ensilage either alone or in combination with other forage legumes and forage grasses especially tall fescue, perennial ryegrass and timothy.

ESTABLISHMENT

In general, orchardgrass is easy to establish.

- Soil type: Orchardgrass prefers well drained soil but will tolerate varied soil types.
- Adjust soil pH to an optimum 6.0-7.0
- Fertility: Proper levels of N, P and K are required (refer to soil test)
- Seed bed: Fine, granular, and firm
- Seeding rate: 4 - 6 pounds/acre in mixtures and 15-20 pounds per acre in pure stands.
- Seeding time: (spring): March-May; (fall): August-October
- Seeding depth: ¼ to ½ inch

BLIZZARD ORCHARDGRASS

- Superior winter survival
- Improved stand persistence
- Stem rust resistant
- Great forage yield potential
- Excellent seedling and plant vigor
- Widely adapted

Blizzard is a medium-late maturing orchardgrass variety developed from plants selected from a three year old winter survival nursery in Neapolis, Alberta Canada. It is similar in plant structure and color to Benchmark Plus and Haymate, while darker green in color than Okay. Blizzard is similar in winter survival ratings to Kay and Killarney. Selected for superior winter survival with improved stem rust resistance and high forage yield potential, Blizzard is widely adapted throughout the United States and Canada. Whether used for grazing, hay production or in mixes, the agronomic advantages of Blizzard make this a highly desirable variety.

MANAGEMENT

- Avoid grazing new orchardgrass stands until the plants are tightly rooted to avoid up-rooting by grazing animals.
- Overgrazing may weaken stands and may result in stand loss as close grazing will remove the base of shoots where the carbohydrates necessary for re-growth are stored.
- When cutting for hay, harvest at boot stage to early head development. Cutting height should be no less than 3.5-4 inches.
- Pure stand orchardgrass will require nitrogen be applied in split applications to sustain maximum production. Fertilize according to soil test and tonnage removed.
- Orchardgrass in mixtures with legumes should require less additional nitrogen fertilization. This should be based on the percentage of legumes in the stand.
- There are no major insect pests of orchardgrass although fields should be monitored and sprayed in the event of insect population increases.
- Leaf diseases are common in orchardgrass. Selecting varieties with improved disease resistance is the best means of disease control since few fungicides are labeled for use on pastures or hay.

PERENNIAL FORAGE *Ryegrass*

ELENA PERENNIAL RYEGRASS

- Superior forage yield potential
- Excellent forage quality
- Vigorous, dark green plants with high disease resistance
- Excellent seedling vigor for fast stand establishment
- Superior palatability
- Winterhardy and persistent

Elena tetraploid perennial ryegrass is a medium maturing variety which has superior forage yield potential, excellent forage quality and extended persistence in state trials throughout the United States. With strong spring and fall forage production plus fast recovery after cutting or grazing, Elena is an ideal component for horse, dairy or beef pasture mixes. Rapid germination and excellent seedling vigor make this variety perfect for pasture renovation as well. Elena also has great rust and leaf disease resistance which helps maintain palatability and digestibility for improved animal performance. When all of these varietal characteristics are combined, Elena is without a doubt the best choice for livestock and dairy producers looking for increased weight gains and milk production.

DESCRIPTION

Perennial ryegrass, *Lolium perenne* L., is a high quality, short lived, cool season forage bunch grass. Having perhaps the highest forage quality among the cool season forage grasses, perennial ryegrass is used primarily in mixtures with forage legumes. It establishes quickly but is not as persistent as the other forage grasses. Seed of forage perennial ryegrass can either be diploid (two sets of chromosomes) or tetraploid (four sets of chromosomes) with the predominant forage type being tetraploid. Either form is acceptable for forage production. The primary differences between the two are that tetraploid forage perennial ryegrass has slightly larger seed and leaf size and develops a more open canopy. There is another type of forage perennial ryegrass that is usually referred to as intermediate ryegrass that is a hybrid between true annual and true forage perennial ryegrass. It has a perennial nature, high forage quality, a large leaf blade and excellent forage yield. It is usually not as persistent as pure forage perennial ryegrass. Perennial ryegrass can also contain an endophyte which can be harmful to animals. Be sure to plant low (less than 5%) endophyte forage perennial ryegrass. Most turf perennial ryegrass contains endophyte.

USES

Perennial ryegrass may be used for hay, silage or grazing. It is seldom used by itself and is commonly used in combination with other forage grasses and legumes especially in grazing situations. Although it is not as long lived as the forage legumes, perennial ryegrass can be over seeded as its percentage of a pasture or hay field declines.

ESTABLISHMENT

- Adjust soil pH to the optimum of 6 – 7. Forage perennial ryegrass can be productive on soils of pH from 5 to 8 but for maximum production and stand life a soil pH of 6 to 7 is best.
- Soil type: perennial ryegrass prefers well drained soils but will tolerate poorer soils to varying degrees.
- Fertilizer: Proper levels of N, P and K are required. Refer to soil test. Micronutrients can be at limiting at times and may need to be added.
- Seed bed: Fine, granular, and firm
- Seeding rate: 30-40 lbs./acre; in mixtures 6-10 lbs./A
- Seeding time (spring): March-April
(fall): August-October
- Seeding depth: ¼ to ½ inch



MANAGEMENT

- New stands of forage perennial ryegrass should not be cut or grazed until they are well established. A minimum height for first harvest is 10 to 12 inches.
- Perennial ryegrass can be grazed/cut to a height of 3.5-4 inches but must be allowed to rest after each period. Rotational grazing is best.
- Fertilize for optimum production based of the amount of forage removed and as recommended by soil test. Split fertilizer applications are best.
- When overseeding forage perennial ryegrass into existing stands, cut/graze existing growth as short as possible before seeding.
- There are usually no insect pests of forage perennial ryegrass.
- When conditions are right, rust can be a problem but is usually not lethal to the plant and can often be controlled by cutting unless the rust favorable conditions persist.
- Be sure to plant low (less than 5%) endophyte forage perennial ryegrass. Most turf perennial ryegrass contains high levels of endophyte. Never use turf type perennial ryegrass in place of forage perennial ryegrass. Turfgrass clippings should never be fed to animals .

438RR ALFALFA

- Roundup Ready® Alfalfa
- High resistance to Aphanomyces Race 2
- Unsurpassed weed control
- Great forage yield potential
- Superior forage quality
- High multifoliate leaf expression
- Excellent winterhardiness and persistence

438RR alfalfa lets you produce cleaner, higher quality alfalfa for greater profit potential. The simplicity and improved crop safety of using one herbicide with the widest window of application available enables you to be in control instead of Mother Nature. 438RR alfalfa performs well over a wide range of environmental conditions and is adapted to all areas where 3, 4 and 5 fall dormancy varieties are planted. With high resistance to Aphanomyces Race 2, 438RR alfalfa features a Wisconsin disease index rating of 35/35 and is also resistant to stem nematodes. Whether it's for great forage yields, superior forage quality or very fast recovery after cutting, 438RR is the choice for commercial hay, beef and dairy producers who want to take advantage of Roundup Ready® Alfalfa technology.

440HVXRR

- HarvXtra™ technology, low lignin alfalfa
- Superior harvest management flexibility
- Extend time between harvests by 7 to 10 days
- More milk or meat production per animal
- Highly resistant to major alfalfa diseases including Aphanomyces race 1
- Stacked with Roundup Ready® Technology for excellent weed control and crop safety

440HVXRR Alfalfa gives growers the ability to better manage the yield-versus-quality tradeoff. It offers more flexibility in a cutting schedule to achieve improved forage quality or greater yield potential when compared to conventional alfalfa at the same stage of maturity. The HarvXtra™ technology provides unprecedented flexibility by widening cutting windows, which gives growers the option at each cutting to a) Maintain their normal harvest schedules for higher-quality forage, or b) delay harvest for 7-10 days for increased yield potential, without sacrificing forage quality, compared to conventional alfalfa at the same stage of maturity. 440HVXRR Alfalfa has on average 12-15% less lignin and 12-15% higher neutral detergent fiber digestibility (NDFD) and relative forage quality (RFQ) than conventional alfalfa harvested at the same stage of maturity. 440HVXRR Alfalfa is stacked with Roundup Ready® Technology for unsurpassed weed control with excellent crop safety. 440HVXRR Alfalfa is the industry's first genetically enhanced alfalfa technology developed to maximize forage quality compared to conventional alfalfa at the same stage of maturity, by reducing the amount of lignin in the plant.

EVERMORE ALFALFA

- Rapid regrowth after cutting
- Superior winterhardiness
- Very high yield potential
- Excellent drought tolerance
- First choice for use under intensive management systems

With a superior combination of improved winter-hardiness, very fast recovery after cutting and great forage yield potential, Evermore alfalfa has the agronomic characteristics needed to be top in its class. Evermore has performed exceptionally well in university yield trials over a wide range of environmental conditions and is adapted to all areas where fall dormancy 4 and 5 varieties are planted.

SCEPTER ALFALFA

- Very high resistance to Potato Leafhoppers
- High resistance to Aphanomyces Race 2
- Excellent yield potential
- Superior forage quality
- Excellent stand persistence and winterhardiness
- 35/35 Wisconsin DRI rating
- Widely adapted

Scepter leads the way in leafhopper resistance and is the perfect choice for areas where potato leafhoppers cause economic damage year after year. With a Wisconsin disease resistance index rating of 35/35, great seedling vigor, excellent stand persistence, very fast recovery after cutting and high relative feed quality in sprayed or unsprayed conditions, Scepter should be an integral part of your alfalfa management plan.

DESCRIPTION

Alfalfa, *Medicago sativa L.*, is a long-lived, small-seeded perennial forage legume (fixes nitrogen). It has high feed value and is an excellent source of protein. Its deep tap root may penetrate the soil to a depth of 25 feet or more. With proper care and management, alfalfa stands can be productive for several years.

USES

Alfalfa may be utilized as dry hay, meal (pellets), silage, or grazed directly. Alfalfa can be grown alone or in combination with other legume and forage grass species. Compatible legumes include red clover, white clover and birdsfoot trefoil. The most commonly used forage grasses in mixtures with alfalfa are orchardgrass, tall fescue, smooth brome and perennial ryegrass.

ESTABLISHMENT

- Adjust soil pH to 6.5 – 7 (optimum for establishment and production).
- Soil type: Preferably deep, well drained. Alfalfa can produce on more marginal soils as long as they are not wet soils.
- Fertilizer: Refer to soil test, alfalfa will usually respond to P and K. Micronutrients can also be limiting at times and may need to be added.
- Seed bed: Prepare a fine, granular, and firm seed bed to ensure good seed to soil contact
- Seeding rate: 20 – 25 pounds/acre; 10-15 lbs. in mixtures
- Seeding time: (spring): February-April
(fall): August-September
- Seeding depth: ¼-½ inch depending on soil type. Plant shallower on heavy soils.

MANAGEMENT

- First hay harvest at 1/10 bloom, then on approximately a 28-30 day intervals. (This excludes 440HVXRR HarvXtra as it has more flexibility)
- First graze should be 1/10 bloom, then timing should be based on stocking rate/plant height to maximize efficiency. Rotation grazing is best, requires proper use and rest periods.
- Do not cut or graze alfalfa below 3 inches in height.
- Split applications of fertilizer after cutting or grazing periods will ensure optimum quality and production.
- Spray for weeds as necessary following all label directions and cautions.
- Insect pests include alfalfa weevil, potato leaf hopper and aphids. Check fields regularly and spray as needed. High insect populations can reduce yield, reduce quality and shorten stand life.
- Diseases are present in most soils. Plant varieties with adequate disease resistance and use seed that is treated with a fungicide.
- Plant varieties with appropriate Fall Dormancy ratings (Fall Dormancy 3-5) and adequate winter survival (ratings of 3 or less).
- Caution should be used when grazing cattle on alfalfa as bloating can occur. Bloating can be prevented by feeding dry alfalfa hay to cattle before grazing and not allowing hungry cattle to graze young, wet alfalfa.

PERENNIAL FORAGE *Timothy*

DERBY TIMOTHY

- Early maturing variety
- High yield potential
- Excellent persistence
- Superior horse hay
- Improved winterhardiness
- Selected for improved regrowth after cutting

Derby is an improved timothy variety that was selected for its improved regrowth after cutting. Derby has excellent persistence, high yield potential and is a superior hay for horses. Derby is a great companion grass to legumes and its early maturity goes along well with the growth cycle of many legumes. Derby is a top performer in university trials and is best suited for northern areas of the transition zone and north.

DESCRIPTION

Timothy, *Phleum pratense L.*, is a shallow rooted, winter hardy, perennial forage bunch grass. It is well adapted to cold, wet environments with the ability to survive harsh winters and survive ice encasement. It does not tolerate drought and therefore is limited in the transition zone. Timothy produces a corm (carbohydrate storage area that looks like a small bulge in the lowest part of the stem and is usually found below ground) from which new tillers originate and new shoots develop. Although it can be grown alone, timothy is most commonly grown in combination with the legumes, alfalfa, red clover or birdsfoot trefoil and occasionally other forage grasses. Timothy has very good forage quality. Most forage yield occurs in the spring and fall with summer re-growth being highly dependent on available soil moisture and temperature. The maturity type of timothy is important when considering variety selection. Typically, later maturing varieties are used in northern areas and early maturing types are used more frequently for southern areas. The maturity issue is related to the timing of the first harvest when timothy is planted with alfalfa. There is a wide overlap in the use of timothy maturities.

USES

It can be utilized as hay, silage or pasture. When used for hay or silage, timothy is usually planted in combination with alfalfa. When used for pasture, timothy is usually planted with red clover and/or birdsfoot trefoil. Other forage grasses like orchardgrass or perennial ryegrass may also be used in timothy mixtures. Timothy is a very flexible and forgiving crop making it a favored forage grass of many producers.



ESTABLISHMENT

- Soil pH should be adjusted to an optimum of 6 – 7. Timothy can be productive over a wide pH range.
- Soil type: Timothy is capable of producing forage on wet soils but will have optimum production on well drained soils.
- Fertilizer: Proper levels of N, P and K must be supplied. Refer to a soil test. Micronutrients can be limiting at times and may need to be added.
- Seed bed: Fine, granular, and firm
- Seeding rate: 6-12 lbs./acre; in mixtures 2-6 lbs./acre
- Seeding time: (spring): February-April
(fall): August-September
- Seeding depth: 1/4-1/2 inch

MANAGEMENT

- New stands of forage timothy should not be cut or grazed until they are well established.
- Cutting or grazing height should be no less than 3.5-4 inches to protect the crowns which are vital for both re-growth and stand persistence.
- Frequent harvest (more than 3 or 4 times per year) or grazing may cause stand decline. Rotational grazing is advised.
- Letting timothy “rest” in the fall prior to the onset of winter will allow time for adequate carbohydrate reserves to be accumulated ensuring winter survival and vigorous spring growth
- Fertilize for optimum production based on the amount of forage removed and as recommended by soil test.
- There are usually no insect pests of timothy





SOUTHERN BELLE RED CLOVER

- High resistance to common root knot nematode
- Early, nondormant type
- High forage yield potential
- Ideal for pastures and hay
- Excellent seedling vigor
- Improved leaf disease resistance
- Resistant to powdery mildew
- High nitrogen fixation
- Adapted throughout Florida and the southern U.S.

Southern Belle red clover is a unique new early non-dormant variety developed for Florida and the southern U.S. Southern Belle has the highest root knot nematode resistance of any commercial red clover variety available and was selected for its superior seasonal performance. This high quality red clover outperforms northern developed varieties in the lower south and can be grazed in late winter and early spring or used for hay. In Florida, Southern Belle is primarily used as a winter annual and will reseed itself under proper late spring management. Southern Belle is also excellent for overseeding bermudagrass.

SOUTHERN STATES® RED CLOVER

- Superior forage quality, persistence and yield
- Excellent winterhardiness
- High forage yield potential
- Selected for persistence under intense grazing pressure
- Improved field resistance to Black Patch (*Rhizoctonia*)
- High resistance to Northern and Southern anthracnose

SS-0303RCG is an elite, new generation, diploid medium red clover developed from plant selections in Lexington, Kentucky. This variety delivers superior forage quality, higher forage yields, improved stand persistence under grazing pressure and greater disease resistance. SS-0303RCG performs extremely well over a wide geographic area and is highly resistant to northern and southern anthracnose, resistant to powdery mildew and has shown improved field resistance to black patch (*Rhizoctonia*). It reaches 50% bloom approximately one day earlier than Marathon, two days later than Arlington and 3 days later than Kenland. SS-0303RCG is an ideal choice for new pastures, overseeding established grass pastures and hay production.

DESCRIPTION

Red clover, *Trifolium pratense L.*, is a small-seeded, short-lived perennial forage legume (fixes nitrogen) utilized primarily for hay, pasture and soil improvement. It has a branched tap root which often disintegrates during the second growth year. As this happens, secondary roots develop to sustain the plant. Red clover has high forage quality although care must be taken when making hay to prevent mold development. There are basically three types of red clover grown in the United States:

- **Mammoth or Altaswede red clover** is a single cut red clover that is coarse and stemmy, used primarily as a cover crop or for plow-down
- **Medium red clover** is a multiple cut (2-3 per season) 2 year clover.
- **Improved medium red clover** is a multiple-cut red clover that can survive 3 or more years with improved genetics for yield and resistance to anthracnose and mildew.

USES

Red clover can be used as hay, pasture, silage or as a green manure (plow down). Red clover can be grown alone or in combination with other legumes and forage grasses. Compatible legumes include alfalfa, white clover and birdsfoot trefoil. The most commonly used forage grasses in mixtures with red clover are orchardgrass, tall fescue, smooth brome and perennial ryegrass.

ESTABLISHMENT

- Adjust soil pH to 6 – 7 (optimum for establishment and production).
- Soil type: Preferably deep, well drained but red clover can produce on more marginal soils and out performs alfalfa on wetter soils.
- Fertilizer: Refer to soil test, red clover will usually respond to P and K. Micronutrients can be limiting at times and may need to be added.
- Seed bed: Prepare a fine, granular and firm seed bed to ensure good seed to soil contact
- Seeding rate: 8 – 12 pounds/acre; 2-4 lbs. in mixes
- Seeding time: (spring): February-March
(fall): August-September
- Red clover can also be frost seeded into existing forage stands.
- Seeding depth: Plant ¼-½inch depending on soil type. Plant shallower on heavy soils.
- Pasture renovation: Red clover is good for pasture renovation and can be successfully established by interseeding an existing pasture.

MANAGEMENT

- Harvest or graze first crop at approximately 20% bloom in pure stands. In mixtures harvest based on predominate species.
- Split applications of fertilizer after cutting or grazing periods will ensure optimum productivity and stand longevity.
- Do not cut or graze red clover below 3 inches in height.
- Insect pests include clover leaf weevil, clover root curculio and aphids. Check fields regularly and spray as needed. High insect populations can reduce yield, reduce quality and shorten stand life.
- Common diseases of red clover are anthracnose and powdery mildew. Plant varieties with adequate disease resistance. Good management practices can minimize disease pressure.
- Caution should be used when grazing cattle on Red Clover as bloating can occur.

WILL LADINO CLOVER

- Increased forage quality/superior nutrition
- High nitrogen fixation (reduce fertilizer cost up to 70%)
- High yield potential
- Excellent regrowth following grazing
- Persists in hot climates
- Superior winterhardiness
- Widely adapted
- Developed jointly by NCSU & USDA

Developed jointly by the USDA and North Carolina State University, Will ladino clover is excellent for pastures and hay applications and is widely adapted to different climates. Will ladino clover is persistent in hot climates, has superior winterhardiness and offers high yield potential. This variety is known for excellent stolon development, rapid establishment and competes well against weeds. Will ladino clover's large leaves are highly nutritious and have superior forage quality. Will offers many benefits when overseeded into established grass pastures including improved animal performance, increased yields and nitrogen supplied to companion grasses via nitrogen fixation.

DESCRIPTION

White clover, *Trifolium repens L.*, is a very small-seeded, potentially long lived, perennial legume (fixes nitrogen) with a prostrate growth habit. It performs well in wetter environments and often dominates wet areas of pastures. Initially producing a tap root which degenerates during the first two years of growth, white clover also produces many fibrous roots and has 80% of its root mass in the top 8 inches of the soil. White clover spreads by stolons (above ground), which can root at leaf nodes that come into contact with soil. With proper care and management, white clover can persist for many years. There are three main types of white clover:

- **Large or ladino white clover** is used primarily in pasture mixtures
- **Intermediate white clover** is used in pasture mixtures and occasionally in turf mixtures
- **Small white clover, white Dutch type** is used primarily for turf mixtures.

USES

White clover is most often used for hay or pasture. White clover is rarely grown alone and is usually grown in combination with other legumes and forage grasses. Compatible legumes include alfalfa, red clover and birdsfoot trefoil. The most commonly used forage grasses in mixtures with white clover are orchardgrass, tall fescue, smooth brome, bermudagrass and perennial ryegrass. It is an excellent component of most any pasture mixture.

OCCOEE LADINO CLOVER

- Significant resistance to southern root-knot nematodes
- High forage yield potential
- High nitrogen fixation (reduce fertilizer cost up to 70%)
- Superior persistence
- Adapted to southeast and transition zones
- Developed by University of Florida

Ocoee is an elite ladino clover with significant tolerance to southern root-knot nematodes. This tolerance translates into increased stand longevity for farmers in areas where nematodes cause reductions in yields and contribute to stand decline. Released by the University of Florida, Ocoee is the result of breeding work to develop a variety combining the positive attributes of Osceola with improved tolerance to southern root-knot nematodes. Ocoee is widely adapted and will thrive in the southeast and transition regions of the US. Increased forage quality, high yield potential and stand longevity are important characteristics of Ocoee and make it an ideal choice for pasture or hay operations. Ocoee offers many benefits when overseeded into established grass pastures including improved animal performance, increased yields and nitrogen supplied to companion grasses via nitrogen fixation.

ESTABLISHMENT

- Adjust soil pH to 6-7 (optimum for establishment and production).
- Soil type: Prefers deep soil with adequate moisture. White clover can produce on more marginal soils and performs well on wet or poorly drained soils.
- Fertilizer: Refer to soil test, will usually respond to P and K. Micronutrients can be limiting at times and may need to be added.
- Seed bed: Prepare a fine, granular and firm seed bed to ensure good seed to soil contact.
- Seeding rate: 4-6 lbs. /acre; 2-4 lbs. /acre in mixtures. An ideal pasture stand would contain 20-30% white clover.
- Seeding time: (spring): February-April
(fall): August-September
- Seeding depth: 1/8-1/4 inch depending on soil type. Plant shallower on heavy soils.

MANAGEMENT

- White clover can be grazed or harvested when it attains 10 inches or more of growth. It should be harvested or grazed to a height of 3 inches. Close grazing, 2 inches of height, will not damage white clover but may negatively affect some companion grass species.
- Insect pests include mites and aphids but they are seldom a problem in mixed grass stands. Should insect levels require spray control, follow all label directions and precautions.
- To maintain a healthy white clover population in a stand containing grasses, select good companion species like tall fescue, orchardgrass, bermudagrass or perennial ryegrass and slant management in favor of the white clover.
- Split applications of fertilizer will ensure optimum quality and production.



PERENNIAL FORAGE *Bermudagrass*



LAREDO FORAGE BERMUDAGRASS

- Blend of improved forage varieties
- Improved cold tolerance
- Highly productive for hay, green chop or pasture
- Extremely heat tolerant, durable and persistent
- Excellent palatability
- Drought and alkali tolerant once established
- ALL-VANTAGE® Seed Coating with AquaBond & Nutri-Start

Laredo is a specially formulated blend of hulled, coated proprietary bermudagrass seed for improved stand establishment. Laredo's growth characteristics create a more versatile forage for high quality hay, grazing and silage. Laredo is widely adapted throughout the transition zone and the southern United States. Laredo is very heat and drought tolerant, grows well on light to heavy soils and can perform over a wide soil pH.

DESCRIPTION

Bermudagrass, *Cynodon dactylon* (L.) Pers., is a highly variable, sod forming, warm season grass that spreads by stolons and rhizomes. Growing best in full sun, bermudagrass is adapted to a wide range of soil conditions. Bermudagrass is both persistent and aggressive with excellent heat, drought and traffic tolerance. There are several improved seeded varieties currently available with increased yield potential, forage quality and cold tolerance. Major improvements in cold tolerance allow new varieties to be grown further north.

USES

Bermudagrass can be utilized as dry hay, pasture or ensilage. Because of its excellent heat and drought tolerance it is one of the most commonly used pasture grasses throughout the southern & central US. It is used either as a pure stand or in mixtures with forage legumes. White clover can be seeded into bermudagrass to improve forage quality, extend the grazing season and to supply part of the nitrogen required for optimum production. In the fall, bermudagrass can be overseeded with annual grasses for productive winter forage.

ESTABLISHMENT

- Adjust soil pH to 6.0-7.0 (for optimum performance and persistence)
- Soil type: Prefers fertile, well-drained soils but does have a wide range of soil adaptability
- Fertility: Proper levels of N, P and K are required (refer to soil test)
- Seed bed: Prepare a fine, granular and firm seed bed to ensure good seed to soil contact

- Seeding rate: 12-15 lbs./A
- Seeding dates: Spring-summer; spring plant after danger of frost has past and soil temperatures are consistently above 65 degrees. When planting in late summer be sure to allow a minimum 60 days of good growth before a frost occurs.
- Seeding depth: maximum of ¼ inch; can be broadcast on top of soil after seed bed is cultipacked and then cultipacked or drug in to ensure good seed to soil contact

MANAGEMENT

- Minimize animal traffic on newly established stands especially when soil is wet.
- Do not harvest or graze bermudagrass until it is well established (6-8 inches in height). Harvest or graze to a height of 2 inches. Laredo should be cut for hay or silage when it reaches 16" in height and then every 4-6 weeks thereafter. The last cutting should be approximately 8 weeks before the first killing frost occurs.
- With proper management and ideal growing conditions, Laredo will be ready to cut or graze 45-50 days after seeding.
- Fertilize for optimum production based of the amount of forage removed and as recommended by soil test. Split fertilizer applications are best, responds well to Nitrogen during the growing season.
- Winter kill can be a concern especially in northern areas of the transition zone. Early fall applications of potassium will aid in winter hardiness.
- Stem maggots, fall army worms and white grubs can be an issues but can be controlled if infestation is caught at early stages

ANNUAL FORAGE *Ryegrass*



FRIA ANNUAL RYEGRASS

- Superior cold tolerance
- High forage yield
- Excellent for overseeding
- Ideal cover crop
- Great disease resistance
- Excellent palatability

Fria annual ryegrass not only delivers outstanding yields in the south and north, but has exceptional cold tolerance that helps in fall establishment and winter survival throughout the transition zone and further north. Developed for cold tolerance, improved crown rust resistance and resistance to gray and helminthosporium leaf spot by Dr. Gordon Prine at the University of Florida; Fria is a late maturing diploid variety.

DESCRIPTION

Annual ryegrass is similar to perennial ryegrass except it is an annual or biennial, depending on climate and/or length of growing season. It may grow a little taller than perennial ryegrass, from 2 to 3 feet tall. Annual ryegrass is a bunchgrass, with numerous long, narrow, stiff leaves near the base of the plant. The under surfaces of leaves are bright, glossy and smooth. Inflorescence stems are nearly naked.

USES

Annual ryegrass is primarily used for forage quick cover in erosion control plantings. In the South, it is used as a winter annual forage for overseeding warm season grasses.

ANNUAL FORAGE *Ryegrass* (continued)

ESTABLISHMENT

Annual Ryegrass is relatively easy to establish.

- Soil type: Annual Ryegrass prefers fertile, well-drained soil but will tolerate varied soil types
- Adjust soil pH to an optimum 6 – 7
- Fertilizer: Proper levels of N-P-K are required. (refer to soil test)
- Seed bed: Fine, granular, and firm
- Seeding rate: 6-10 lbs. /acre in mixtures depending on companion species; 25-35 drilled in pure stands depending on timing. Increase seeding rate by approximately 20-25% when broadcasting
- Not recommend to mix with perennial cool season grasses at establishment due to competition
- Seeding time: (spring): March-May; (fall): August-October
- Seeding depth: ¼ to ½ inch

MANAGEMENT

- Avoid grazing new annual ryegrass stands until the plants are tightly rooted to avoid up-rooting by grazing animals, harvest or grazing should be delayed until plants are 10 to 12 inches tall
- Overgrazing fall planted ryegrass may weaken stands ability to overwinter. Ryegrass responds well to good management, such as rotational grazing and split fertilizer applications.
- Annual ryegrass should be rotationally grazed to maximize forage potential and persistence. When spring growth is grazed to a height of 3 to 4 inches remove animals. Allowing 7 to 10 inches of regrowth between grazing.
- Ryegrass should be cut for hay at boot stage prior to seed head emerging to maximize forage quality.
- Fall army worms are the biggest issue with fall stands of annual ryegrass and can be controlled if infestation is caught at early stages.
- Rust can be an issue in the Deep South. Rust is best controlled by selecting varieties that are resistant.

SUMMER ANNUAL *Teff*



DESSIE TEFF

- High-yielding warm-season annual forage grass variety
- Excellent palatability and forage quality
- Ideal for horses and other livestock
- Great for use as an emergency forage crop and for double cropping
- Good for interseeding thin alfalfa stands in final year of production
- Excellent rotational crop when replacing alfalfa or perennial grass stands
- Can be used as a green manure crop and for erosion control

Dessie Teff was developed for high forage production and quality without problems such as prussic acid or nitrate buildup associated with other summer annuals. Dessie makes the ideal hay for horses with great palatability, digestibility, a mineral content high in calcium and iron, and an attractive, green color important for the premium horse hay market. Dessie is widely adapted throughout the United States and will tolerate drought conditions as well as wet soils. Dessie is a low input crop that has very few disease or pest problems and does not require high amounts of fertilizer for optimum production.

DESCRIPTION

Teff, *Eragrostis tef* Zucc., is a warm season annual grass that is native to Ethiopia. It is a fast growing crop that has fine stems, shallow roots and is not frost tolerant. Teff grows in frost free environments preferring temperatures from 60 – 85 degrees Fahrenheit and tolerates soil moisture levels ranging from wet to drought-stressed conditions. It can be harvested multiple times during the growing season as a dry hay, silage or pasture. Teff is a premium hay with quality comparable to timothy. Teff has become a favorite of horse's owners in the last few years but is a good choice for wide range of livestock including dairy, beef and sheep.

USES

Teff is normally used for hay, however can be used for pasture or silage. When grazed careful consideration must be made to make sure the plant is firmly rooted to prevent livestock from uprooting plants. For this reason it is generally recommended most often for livestock such as horses and sheep that have front teeth and bite instead of tearing such as cattle do. Grazing teff is only recommended on heavy soils where it can develop a strong root system.

ESTABLISHMENT

- Adjust soil pH to an optimum of 6 – 7. Teff will tolerate a wide range of soil PH, much more so than other crops.
- Soil Type: Teff can grow in variable soil types and conditions (well drained to wetter soils). Fertilizer: Proper levels of N, P and K are required. Please refer to soil test. Do not exceed 50 units of N at planting. Micronutrients can be limiting at times and may need to be added.

- Seed bed: Fine, granular, and firm is required for Teff because of seed size. Teff will not establish well in a loose seed bed.
- Seeding Rate: 4 – 6 lb. (raw) or 8 – 12lb (coated) per acre. Seed size is approximately 1.3 million seeds per lb.; coating helps to manage placement of seed.
- Seeding Date: May-July; after danger of frost has past and soil temperatures at planting should be at least 65°
- Seeding depth: 1/8-1/4 inch; stand failures are common due to planting to deep.

MANAGEMENT

- Cutting/grazing height: a minimum of 4 inches is desired for regrowth potential.
- For optimum quality and to maximize regrowth, first harvest in pre-boot to early boot stage (approximately 50 days after planting). If seed heads have emerged, it will adversely affect regrowth and the opportunity for maximizing future cuttings.
- Additional harvest should be made in approximately 40 day intervals depending on location and environmental conditions.
- Split applications of nitrogen (approximately 30-40 units) after each harvest to maximum production. Too much nitrogen can cause severe lodging issues.
- No disease or pest are common in this species.
- Teff is not known to have issues with prussic acid accumulation or nitrate toxicity like other summer annuals.

SUMMER ANNUALS *Sorghum Seed*

To ensure that you are growing high quality forage and silage, you need a sorghum variety you can plant with confidence. So, how do you know which one is the most nutritious for your animals and the best suited for your growing conditions? Your Southern States® agronomist is ready to recommend the most productive variety for your growing environment. Feel more confident about your sorghum, sudangrass and millet investment this season.

HYBRID SORGHUM SEED

CHARACTERISTICS

- Use for grain and forage
- Able to handle dry conditions

SS 540 GRAIN 95 TO 105-DTM

This hybrid works well as a double crop behind wheat.

- Seeding Rate: 3 to 5 pounds per acre
- Seeding Date: Summer (May-July)
- 45 to 50" tall with good standability
- Excellent yields under dryland conditions
- Semi-open head with red grain
- Very good disease package - tolerance to anthracnose, Head Smut, MDMV virus, and Greenbug Biotype C and E

SS 655 GRAIN 110 TO 115-DTM

A variety with excellent yield history.

- Seeding Rate: 8 to 10 pounds per acre
- Seeding Date: Summer (May-July)
- 42 to 48" tall with very uniform plant height
- Semi-open head
- Red colored grain
- Good disease package - tolerance to Head Smut, MDMV virus and Greenbug Biotype C

SS 1515 FORAGE 115 TO 120-ENSILAGE

Excellent grain-to-stover ratio.

- Seeding Rate: 5 to 10 pounds per acre
- Seeding Date: Summer (May-July)
- Very high crude protein level
- Very good green weight
- Excellent dry weight potential
- Very good standability
- Resistant to greenbug biotype C and E

SS 2010 BDF 110 DAYS TO SOFT DOUGH

Newest generation of BMR forage sorghums.

- Seeding Rate: 4 to 12 pounds per acre
- Seeding Date: Summer (May-July)
- High yield
- Newest generation of BMR quality
- Brachytic dwarf for standability

GRAIN VERSUS FORAGE

Primarily, grain sorghum is grown for its grain qualities, but can be used as a silage. Forage sorghum is generally planted for its silage properties only.



SUMMER ANNUALS *Millet*

HYBRID PEARL MILLET SEED

CHARACTERISTICS

- Use for silage and pasture
- Taller, thicker stemmed variety more suitable for grazing
- Dwarf type recommended for hay
- Safe for horses



SS 635 DWARF

Excellent choice for hay.

- Seeding Rate: Drill: 10 to 20 pounds per acre
Broadcast: 15 to 25 pounds per acre
- Seeding Date: Summer (May-July)
- Produces lots of wide leaves
- Superior leaf-to-stem ratio
- Tolerates acid soil very well

SS 1562M BMR

Flexible forage for grazing, hay, or silage.

- Seeding Rate: Drill: 10 to 20 pounds per acre
Broadcast: 15 to 25 pounds per acre
- Seeding Date: Summer (May-July)
- BMR trait which reduces lignin and increases palatability
- Excellent forage producer with enhanced animal performance
- Dwarfing gene improving standability, increasing leaf to stem ratio
- Good regrowth potential

SUMMER ANNUALS *Sorghum/Sudangrass Seed*

HYBRID SORGHUM/SUDANGRASS SEED

CHARACTERISTICS

- Use for silage, hay and pasture
- Cut at immature stage, when plants are 30 to 40" tall, for the best quality silage and hay
- Not recommended for horses

SS 130 BMR SUDANGRASS

With Hi-Gest™ trait to reduce lignin.

- Seeding Rate: Drill: 20 to 25 pounds per acre
Broadcast: 25 to 50 pounds per acre
- Seeding Date: Summer (May-July)
- Profuse tillering
- A finer stemmed hay than sorghum sudans
- More tonnage than millets
- Recommended for hay

SS 220 BMR SORGHUM X SUDANGRASS

Reduced lignin content for greater digestibility and more efficient cattle gains.

- Seeding Rate: Drill: 10 to 20 pounds per acre
Broadcast: 12 to 30 pounds per acre
- Seeding Date: Summer (May-July)
- Excellent palatability and excellent drought tolerance
- Leafy with heavy tillering
- Excellent recovery after cutting

SS 211 SORGHUM X SUDANGRASS

High tillering produces high levels of crude protein and sugars.

- Seeding Rate: Drill: 25 pounds per acre
Broadcast: 35 pounds per acre
- Seeding Date: Summer (May-July)
- Excellent re-growth and excellent seed vigor
- Suitable for pasture or haylage
- Drought tolerant

SS 1652SS BMR SORGHUM X SUDANGRASS

Excellent choice for hay.

- Seeding Rate: Drill: 15 to 60 pounds per acre
Broadcast: 20 to 65 pounds per acre
- Seeding Date: Summer (May-June)
- Excellent recovery after cutting
- High digestibility and palatability
- Dry stalk gene allows quicker dry down



PASTURE MIXES

High quality pasture mixes can provide the nutritional needs of livestock to optimize animal performance and maximize return per acre. These are an excellent choice for producers that want high quality hay or pasture. To meet these needs we start with only the highest quality forage varieties, these species are chosen for the regional adaptability and formulated in the proper ratios to ensure maximum production. Professional pasture mixes contain forage grasses and legumes to provide a balance of exceptional yield, nutrition, stand persistence and disease resistance. These premium mixtures along with proper management practices will provide you with the best opportunity to meet your forage goals and extend grazing days on your pastures.

- Designed for regional adaptation and performance
- Superior yield and animal performance
- Excellent Palatability
- Improved persistence and recovery
- Increased drought tolerance and winterhardiness
- Maximum production per acre

SS PRO HORSE PASTURE MIXTURE-NORTH

Ingredients (improved varieties)

- 30% Orchardgrass
- 25% Kentucky Bluegrass
- 25% Perennial Ryegrass
- 15% Timothy
- 05% Ladino Clover

Planting Specifications:

- Planting Rate (New Seeding): 25 lbs./Acre
(Overseeding): 15 lbs. /Acre
- Plating Dates (spring): March-May
(fall): August-October
- Soil Fertility (Optimal pH): 6-7; soil test for fertilizer recommendations

SS PRO BEEF PASTURE MIXTURE

Ingredients (improved varieties)

- 50% Orchardgrass
- 20% Tall Fescue
- 15% Timothy
- 10% Medium Red Clover
- 05% White Clover

Planting Specifications:

- Planting Rate (New Seeding): 25 lbs./Acre
(Overseeding): 15 lbs. /Acre
- Plating Dates (spring): March-May
(fall): August-October
- Soil Fertility (Optimal pH): 6-7; soil test for fertilizer recommendations

SS PRO HORSE PASTURE MIXTURE-SOUTH

Ingredients (improved varieties)

- 35% Tall Fescue
- 30% Orchardgrass
- 10% Kentucky Bluegrass
- 10% Timothy
- 10% Annual Ryegrass
- 05% Ladino Clover

Planting Specifications:

- Planting Rate (New Seeding): 25 lbs./Acre
(Overseeding): 15 lbs. /Acre
- Plating Dates (spring): March-April
(fall): August-October
- Soil Fertility (Optimal pH): 6-7; soil test for fertilizer recommendations

SS LOW ENDOPHYTE PASTURE MIX

Ingredients (improved varieties)

- 50% Low Endophyte Forage Tall Fescue
- 50% Low Endophyte Forage Tall Fescue

Planting Specifications:

- Planting Rate (New Seeding): 25 lbs./Acre
(Overseeding): 15 lbs. /Acre
- Plating Dates (spring): March-May
(fall): August-October
- Soil Fertility (Optimal pH): 6-7; soil test for fertilizer recommendations



OTHER SPECIES

BIRDSFOOT TREFOIL

Birdsfoot trefoil, *Lotus corniculatus L.*, is a small seeded, perennial legume (fixes nitrogen) used for pasture, hay or silage. It can be grown alone or in mixtures with other forage legumes and forage grasses. Birdsfoot trefoil is usually grown on poorer soils in conjunction with forage grass species, especially timothy. Trefoil tolerates wet soils and maintains older leaves making it suitable for stockpiling pasture forage. Trefoil does not cause bloat in grazing animals.

CRABGRASS

Crabgrass is a high-quality summer annual forage grass that reseeds itself year after year, if it is managed to allow the plant to flower and produce seed during the previous season. While often considered a weedy species, it is a valuable temporary summer forage crop, for pasture and livestock grazing or hay production. Crabgrass forage has excellent quality and palatability, but yield is variable and depends on soil fertility and rainfall. It is well adapted throughout the US and thrives during hot, dry and humid weather.

CRIMSON CLOVER

Crimson Clover should be utilized as a winter annual clover to fix atmospheric as well as soil nitrogen up to 100# N/acre. Crimson will winter kill in the northern states most years, but should overwinter in the south. Deep set roots improve soil tilth and overall soil condition. Planting crimson clover with a grass or small grain is an excellent cover crop option for erosion and weed control as well as offering the ability to be grazed.

INTERMEDIATE WHITE CLOVER (Crusade Intermediate)

White clover, *Trifolium repens L.*, is a very small-seeded, potentially long lived, perennial legume (fixes nitrogen) with a prostrate growth habit. It performs well in wetter environments and often dominates wet areas of pastures. Initially producing a tap root which degenerates during the first two years of growth, white clover also produces many fibrous roots and has 80% of its root mass in the top 8 inches of the soil. White clover spreads by stolons (above ground), which can root at leaf nodes that come into contact with soil. With proper care and management, white clover can persist for many years. There are three main types of white clover: (1) large/ladino (2) Intermediate/New Zealand type (3) Small white clover/white dutch type. Crusade is a improved intermediate white clover with increased winter activity and a strong recovery from harvest.



OTHER SPECIES

KENTUCKY BLUEGRASS

Kentucky bluegrass, *Poa pratensis* L., is a short-to-medium height, cool-season, long-lived, highly palatable perennial grass that has smooth, soft, green to dark green leaves with boat-shaped tips. It spreads via rhizomes to form a dense sod and grows best during cool, moist weather on well-drained, fertile soils with a pH between 6 and 7. Although Kentucky bluegrass is found throughout the United States, it is most important agriculturally in the north central and northeastern regions and is best adapted to areas where the average daily temperature during July does not exceed 75°F. Warm summer temperatures are the most limiting environmental factor to Kentucky bluegrass production. Kentucky bluegrass is found in most pastures in the northeastern United States because it tolerates close and frequent grazing better than other cool-season forage grasses. This ability makes Kentucky bluegrass an ideal species for permanent pastures that are continuously grazed. In addition, the dense sod formed by Kentucky bluegrass rhizomes make it ideal for erosion control, particularly in grass waterways and is an excellent footing for horses.

Planting Recommendations:

- Soil pH: 6.0-7.0 (optimal performance)
- Fertility: refer to soil test
- Planting Rate (pure): 10-15 lbs./A
(mixtures): 5-10 lbs. /A
- Planting Date (spring): February-April
- (fall): August-September
- Planting Depth: 1/8-1/4 inch

SMOOTH BROME (Peak Smooth Brome)

Smooth brome grass, *Bromus inermis* Leyss., is an erect leafy, long-lived, sod forming, cool season perennial forage grass. It has a fibrous root system and forms a dense sod from the development of rhizomes (underground stems). Deep, well drained soils are preferred but a wide range of soil types are tolerated. In addition to being very winter hardy, smooth brome grass can tolerate both periods of drought, during which it will become dormant and short periods of flooding. Production of high quality forage is another positive attribute of smooth brome grass but it can be slow to recover if the cutting height is too low. The “W” shaped constriction approximately half way down the leaf sheath can be used to easily identify smooth brome grass. Peak Smooth Brome is an improved variety developed by Cornell University for increased persistence, yield and foliar disease resistance.

Planting Recommendations:

- Soil pH: 6.0-7.0 (optimal performance)
- Fertility: refer to soil test
- Planting Rate (pure): 10-20 lbs./A
(mixtures): 5-10 lbs. /A
- Planting Date (spring): March-April
(fall): August-September
- Planting Depth: 1/4-1/2 inch



LIVESTOCK CONCERNS

ENDOPHYTE:

Kentucky 31 has long been the standard grass in cool season pastures due to its excellent persistence, durability, adaptability and relatively cheap cost. However, with all of the positive attributes above it does possess one major negative attribute and that is it contains endophytes that can be harmful to the animals that graze or eat the infected grass.

An endophyte is a fungus that grows inside a plant. The endophyte does not infect the plant cells, but grows in the intercellular spaces, usually just under the leaf surface. Endophytes are good for plants but are often harmful to grazing animals.

Domestic animals, particularly horses, that graze or eat endophyte infected grass may develop severe health complications. Cow health may also be adversely affected by eating endophyte infected grass. The health problems come primarily from harmful alkaloids produced by the endophyte/plant association. For this reason tall fescue used in forage production should have low or zero levels of endophyte. Research has determined that endophyte presence in less than 5% of the seed is not harmful to animals grazing or feeding on plants grown from those seed. In nature, wild animals avoid eating grasses that contain endophyte which are bad for them. Even domestic animals will avoid endophyte infected grass if given the choice.

The solution to this problem is to choose an alternative tall fescue product. Southern States offers two products that have the positive attributes of Kentucky 31 without the negative effects of the endophyte. SS Forage-Type Tall Fescue is a low-endophyte tall fescue variety that contains 5% or less endophyte presence and is a top performer in university yield and persistence trials. SS Tall Fescue LE Pasture Mix is a mixture of two endophyte free tall fescue varieties. It provides the persistence, durability and adaptability of a zero endophyte, making it an excellent choice for pasture use.

When a pasture formerly containing endophyte infected plants is reseeded, care must be taken to ensure that a minimal number of plants from the old pasture volunteer or remain in the new pasture. Volunteer plants can grow from either old plant parts or from seed in the soil (seed, which would have been produced when the pasture was allowed to get too mature before harvest, can survive in the soil for years waiting for the right conditions to germinate). As time passes, the volunteer, high endophyte plant percentage may increase in the pasture. If there are enough volunteer, high endophyte plants initially, the pasture may eventually revert back to containing primarily high endophyte grasses. It may look like the new seed plants have become infected with endophyte, but as stated earlier this is not the case. To control volunteer plants, utilize both herbicide and tillage prior to reseeding.

BLOAT:

Many growers use legumes such as clovers in Kentucky 31 fields to dilute the negative effects of the endophyte and others use legumes for nitrogen fixation to reduce nitrogen input costs. Both of these are good practices, however precaution must be taken to avoid bloat issues.

Bloat (Ruminal tympany) is the over production of gas due to the fermentation by microbes in the rumen. This occurs when forages that are easily fermented are eaten in large quantities. The most common causes of bloat are white clover, alfalfa or red clover. To minimize risk it is best to not turn hungry cattle into an area where these legumes are lush. Other options are to only place ruminant animals in these areas for a short period of time or only allow a small area to be grazed. There are supplements that you can feed to help prevent in these situations also.

FORAGE QUICK REF

KIND OF SEED	APPROX. SEEDS PER LB.	LBS. PER BU.	PLANTING RATE LBS. PER ACRE	PLANTING RATE LBS. PER ACRE IN MIXTURES	SEEDING DEPTH (INCHES)
Alfalfa	227,000	60	15 to 20	8 to 10	1/4 to 1/2
Barley	14,000	48	90 to 120	60 to 90	1 to 2
Bermudagrass (Hulled)	2,071,000	40	5 to 10		1/8"
Birdsfoot Trefoil	370,000	60	8 to 10	4 to 8	1/4"
Bluegrass, Kentucky (Forage)	2,177,000	14	10 to 15	4 to 10	1/4"
Bluestem, Big	165,000	22	5 to 12 PLS		1/4 to 1/2
Bluestem, Little	237,000		5 to 8 PLS		1/4 to 1/2
Brome, Meadow	93,000		12 to 20	4 to 8	1/4 to 1/2
Brome, Smooth	138,000	14	15 to 20	3 to 10	1/4 to 1/2
Buckwheat	15,000	52	40 to 55		1/2 to 1
Buffalograss	49,000		40 to 80 PLS		1/2"
Chicory	426,000		4 to 5	2 to 3	1/8 to 1/4
Clover, Alsike	728,000	60	7 to 8	1 to 3	1/4 to 1/2"
Clover, Arrowleaf	400,000	60	5 to 10		1/8 to 1/2
Clover, Berseem	207,000	60	10 to 20		1/4 to 1/2
Clover, Crimson	150,000	60	20 to 30		1/4 to 1/2
Clover, Kura	227,000	60	10	4 to 6	1/4 to 1/2
Clover, Ladino White	768,000	60	4 to 6	2 to 4	1/8 to 1/4
Clover, Mammoth Red	272,000	60	8 to 12	4 to 8	1/4 to 1/2
Clover, Medium Red	272,000	60	8 to 12	4 to 8	1/4 to 1/2
Clover, New Zealand White	768,000	60	4 to 6	2 to 4	1/8 to 1/4
Clover, White Dutch	768,000	60	6 to 8	2 to 4	1/8 to 1/4
Crownvetch	138,000	60	20 to 40	5 to 10	1/2"
Dropseed, Prairie			5 PLS		1/2"
Dropseed, Sand	5,300,000		2 to 4 PLS		1/2"
Eastern Gamagrass	724,000		8 to 10 PLS		1/2"
Fescue, Hard	592,000		5 to 10		1/4 to 1/2
Fescue, Meadow	227,000	19	8-12 PLS		1/4 to 1/2
Fescue, Tall	227,000	25	10 to 30		1/4 to 1/2
Festulolium	227,000		25 to 45	8 to 20	1/4"
Grama, Blue	724,000		4 to 10 PLS		1/4 to 1/2
Grama, Sideoats	160,000		6 to 12 PLS		1/2"
Hairy Vetch	16,000	60	20 to 25		1
Indiangrass	200,000	10	6 to 12 PLS		1/2"
Kales	200,000		3.5 to 4	2 to 3	1/2"
Lespedeza, Korean (Hulled)	238,000	25	25 to 35		1/4 to 1/2
Lespedeza, Striate (Kobe)	200,000	25	25 to 35		1/4 to 1/2
Millet, Browntop	142,000	50	10 to 30		1/2 to 1
Millet, Foxtail (German)	220,000	50	20 to 25		1
Millet, Japanese	143,000	35	15 to 30	8 to 12	1

REFERENCE SEED CHART

SUGGESTED PLANTING DATES	EMERGENCE TIME) (DAYS)	PRIMARY USE	LIFE CYCLE
March-May, August-September	7	Hay, Silage, Pasture	Perennial
March-April, August-October	7	Pasture	Annual
April-June, August-September	21	Hay, Pasture	Perennial
February-May, August-October	7	Pasture	Perennial
February-May, August-September	28	Pasture	Perennial
May-June	28	Hay, Pasture	Perennial
May-June	28	Pasture	Perennial
March-May, August-September	14	Hay, Pasture	Perennial
March-May, August-September	14	Hay, Pasture	Perennial
June-July	7	Hay, Grain, Wildlife	Annual
May-June	14-21	Pasture	Perennial
April-May-August-September	7 to 21	Pasture, Wildlife	Perennial
February-May, August-October	7	Hay, Pasture	Perennial
August-October	7	Hay, Pasture	Annual
May-June, August-October	7	Hay, Pasture	Annual
August-October	7	Hay, Pasture	Annual
April-May, August	7	Hay, Pasture	Perennial
February-May, August-October	7 to 10	Hay, Pasture	Perennial
February-May, August-October	7	Hay, Silage, Pasture	Perennial
February-May, August-October	7	Hay, Silage, Pasture	Perennial
February-May, August-October	7 to 10	Pasture	Perennial
February-May, August-October	7 to 10	Pasture	Perennial
March-May, August-September	14	Erosion Control	Perennial
March-June		Pasture	Perennial
March-June		Pasture	Perennial
May-June	14	Hay, Pasture	Perennial
February-May, August-September	14	Erosion Control	Perennial
March-May, August-September	14	Pasture	Perennial
March-May, August-September	14	Hay, Pasture, Erosion Control	Perennial
March-May, August-September	14	Hay, Pasture	Perennial
May-July	14	Pasture	Perennial
May-June	28	Pasture	Perennial
August-October	14	Hay, Pasture	Annual
May-June	28	Pasture	Perennial
May-June	7	Pasture	Annual
March-April	14	Hay, Pasture, Erosion Control	Annual
March-April	14	Hay, Pasture, Erosion Control	Annual
May-July	10	Hay, Pasture	Annual
May-July	10	Hay	Annual
April-July	10	Hay, Wildlife, Erosion Control	Annual

FORAGE QUICK REF

KIND OF SEED	APPROX. SEEDS PER LB.	LBS. PER BU.	PLANTING RATE LBS. PER ACRE	PLANTING RATE LBS. PER ACRE IN MIXTURES	SEEDING DEPTH (INCHES)
Millet, Pearl	60,000	52	15 to 25		1/2"
Millet, Proso	80,000	56	20 to 30		1
Oats, Spring, Fall	16,000	32	64 to 120	60 to 90	1 to 2
Orchardgrass	416,000	14	10 to 20	3 to 6	1/4 to 1/2
Peas, Austrian Winter	2,000	60	30 to 40	20 to 30	1/4 to 1/2
Peas, Cow	3,000	60	75 to 120		1/4 to 1/2
Rape	145,000	50	5 to 8	4 to 6	1/2"
Red Top	4,990,000	14	4 to 5	1 to 2	1/4"
Reed Canarygrass	480,000	47	8 to 10	4 to 8	1/4 to 1/2
Rye Grain	18,000	56	90 to 120	60 to 90	1 to 2
Ryegrass, Annual	227,000	24	30 to 40	6 to 10	1/4 to 1/2
Ryegrass, Perennial	227,000	24	30 to 40	6 to 10	1/4 to 1/2
Sainfoin	30,000	55	20	15	1/2 to 3/4
Sorghum, Forage	17,000	56	15 to 50		1
Sorghum, Forage BMR	17,000	56	6 to 8		1
Sorghum, Grain	15,000	50	4 to 20		1
Sorghum-Sudangrass	21,000	56	20 to 40		1
Sorghum-Sudangrass BMR	21,000	56	20 to 45		1
Sudangrass	43,000	40	20 to 45		1/2 to 1
Sunflowers, Peredovik	7,000	32	8 to 40		1
Swedes	200,000		2 to 3		1/2"
Sweetclover, White Blossom	259,000	60	6 to 15	3 to 8	1/4 to 1/2
Sweetclover, Yellow Blossom	259,000	60	6 to 15	3 to 8	1/4 to 1/2
Switchgrass	389,000	55	4 to 8 PLS		1/2"
Timothy	1,152,000	45	6 to 12	2 to 6	1/4 to 1/2
Triticale	15,000	48	90 to 120	60 to 90	1 to 2
Turnips	220,000	55	2 to 8	1 to 2	1/2"
Weeping Lovegrass	1,482,320	60	3 to 5	1 to 2	1/2"
Wheat	11,000	60	60 to 120	60 to 90	1 to 2
Wheatgrass, Crested	175,000	22	10 to 12 PLS		1/2"
Wheatgrass, Intermediate	88,000		12 to 18 PLS		1/2"
Wheatgrass, Pubescent	90,000		12 to 18 PLS		1/2"
Wheatgrass, Slender	110,000		8 to 15 PLS		1/2"
Wheatgrass, Tall	160,000		10 to 12 PLS		1/2"
Wheatgrass, Western	110,000		8 to 15 PLS		1/2"

REFERENCE SEED CHART

SUGGESTED PLANTING DATES	EMERGENCE TIME) (DAYS)	PRIMARY USE	LIFE CYCLE
May-July	7	Pasture, Silage	Annual
May-July	10	Grain, Wildlife	Annual
March-April, August-September	10	Hay, Pasture	Annual
March-May, August-September	18	Hay, Pasture	Perennial
March-April, September-October	7	Hay, Pasture, Silage	Annual
May-June	8	Hay, Pasture, Silage	Annual
April-August	7	Pasture	Annual
March-May, August-September	10	Pasture, Erosion Control	Perennial
March-May, August-September	21	Hay, Pasture	Perennial
March-April, August-September	7	Hay, Pasture	Annual
February-May, August-September	14	Hay, Pasture	Annual
February-May, August-September	14	Hay, Pasture	Perennial
March-April	10	Hay, Pasture, Wildlife	Perennial
May-July	10	Silage	Annual
May-July	10	Silage	Annual
May-July	10	Grain, Wildlife	Annual
May-July	10	Hay, Pasture	Annual
May-July	10	Hay, Pasture	Annual
May-July	10	Hay, Pasture	Annual
May-July	7	Wildlife	Annual
May-June	7	Pasture	Annual
February-May, August-October	7	Pasture	Biennial
February-May, August-October	7	Pasture	Biennial
April-May	21	Hay, Pasture	Perennial
March-May, August-September	10	Hay, Pasture	Perennial
March-April, August-October	7	Hay, Pasture	Annual
April-August	7	Pasture	Annual
May-June	7	Hay, Pasture	Perennial
March-April, August-October	7	Pasture	Annual
March-June	10 to 14	Pasture	Perennial
March-June	10 to 14	Pasture	Perennial
March-June	10 to 14	Pasture	Perennial
March-June	10 to 14	Pasture	Perennial
March-June	10 to 14	Pasture	Perennial
March-June	10 to 14	Pasture	Perennial

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