

# RYEGRASS FOR FORAGE

## Highly Preferred by Livestock and Farm Producers

- ❑ Easy and economical to establish
- ❑ Highly nutritious and palatable
- ❑ Can be grown with other forage crops
- ❑ Recovers rapidly from heavy grazing



## RYEGRASS FOR FORAGE

Two ryegrass species are of great importance in forage/livestock production; annual ryegrass (*Lolium multiflorum* Lam.) and perennial ryegrass (*Lolium perenne* L.). Both species are easy to establish, versatile in how they can be used and adapted on a wide range of soil types. They are leafy grasses that produce highly palatable forage that often exceeds 70% digestible dry matter and 20% crude protein. These characteristics enable grazing animals to maintain exceptionally high dry matter intake levels and result in outstanding animal performance.

### ANNUAL RYEGRASS

Annual ryegrass is an outstanding winter annual forage grass that is highly productive. It can be planted on a prepared seedbed, overseeded into the dormant sods of warm season forage crops or used as a winter cover crop and/or winter grazing crop. It is estimated that over two and a half million acres of annual ryegrass are grown for forage in the USA every year. The species is considered an annual, although in a few areas of the USA, plants sometimes live for one and a half years or more, depending on variety and/type, planting date and climatic conditions.

“Westerwolds” type ryegrass is a true annual that will make seed in spring regardless of planting date. This type is widely grown in the Deep South, but less so farther north because some varieties are not highly winter-hardy. “Italian” type ryegrass needs exposure to cold weather in order to head, so when planted in spring it will make little or no seed. In most climates Italian ryegrass acts as an annual and dies in less than one year, but in the northern tier of U.S. some varieties are winter-hardy and may act like a biennial or a weak perennial.

#### Description

Annual ryegrass is a fast-growing bunchgrass that produces several upright tillers from each plant. It has clasping auricles and shiny leaves that generally reach around 8 to 12 inches in length. Ungrazed plants can reach a height of 40 to 50 inches. Well-fertilized ryegrass foliage is a lustrous green color except for the bases of plants, which are yellowish-green. Seedheads, which normally first appear in April or May depending on geographical location, are a single spike and spikelets are in an alternate arrangement on each spike. Seed are awned and there are 9 to 15 florets in each spikelet. It establishes quickly (germination usually occurs within a week to ten days under good conditions), develops an extensive fibrous root system and can be quite competitive with other plants.

#### Adaptation and Use

Annual ryegrass originated in Europe but is widely grown in the USA. The greatest concentration of use at present is in the Deep

#### Annual Ryegrass at a Glance

<b>Origin:</b>	Europe
<b>Characteristics:</b>	Annual or short-lived perennial bunchgrass; bright green, shiny leaves with yellowish-green stem bases. Plants can reach a height of over 4 feet.
<b>Uses:</b>	Pasture, hay, silage, cover crop, turf
<b>Seed:</b>	224,000 seeds/lb, 24 lb/bushel
<b>Seeding rate:</b>	15–30 lbs/acre
<b>Harvest Hay/Silage:</b>	Boot to early head
<b>Grazing:</b>	Begin at 6 to 8 inches; graze to 3–4 inches
<b>Seeding depth:</b>	¼–½ inch
<b>Usual Yield:</b>	3–5 tons dry matter/acre

South from East Texas to North Carolina, but some varieties are winter-hardy enough to be grown in the Midwest. It can be grown on many different soil types and in numerous climates, especially where there are extended periods of mild temperatures (the optimum range being 68° to 77° F) and good soil moisture. It is not shade tolerant or highly drought tolerant but it can be grown on heavy, waterlogged soil and will tolerate brief periods of flooding. It is mostly utilized as pasture but is also widely used for hay, silage, haylage, baleage and greenchop.

Ryegrass pasture can reduce hay or other stored feed requirements for many livestock producers, especially in the Deep South. Fluctuations in hay yields of other forage crops affect the acreage of annual ryegrass planted from year to year, as more ryegrass is planted in poor hay production years. Overseeding warm season grass sods, which is the most common approach to planting annual ryegrass, can extend the grazing season by three months or more.

Annual ryegrass is often grown in a pure stand, especially in Coastal Plain soils, but is also frequently grown with a small grain (rye, oats, wheat or triticale) and/or with an annual clover. In most environments the dry matter yield of annual ryegrass exceeds the yield of small grains, but the distribution of growth is different. Annual ryegrass makes less autumn and winter growth but more spring growth than small grains, with the result being a longer grazing season from a mixture. Annual legumes also make most of their growth in spring, so growing ryegrass with a legume reduces the likelihood of legume bloat.

## Establishment

As compared to many forage crops, annual ryegrass has good seedling vigor and is easy to establish. However, in order to ensure rapid germination, emergence and prompt stand establishment, certain guidelines should be followed. Successful establishment requires use of high quality seed. Germination level, percent of weed seed present and other valuable information is listed on the seed label. Next, because annual ryegrass responds well to fertilization, a soil test should be taken prior to planting to determine soil amendment needs. The optimum pH for this grass is 6.0 to 7.0. Any phosphorus, potassium or secondary nutrients recommended should be applied at or near planting time.

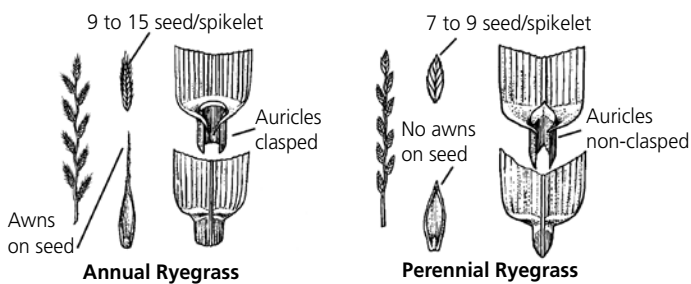
The amount of nitrogen (N) that needs to be applied at planting time will vary depending on the situation. If there will be little time between planting and the occurrence of cold weather that will limit grass growth, as little as 20 pounds of N per acre may be applied. With early plantings, especially small grain/ryegrass mixtures planted on a prepared seedbed, at least 60 pounds of N per acre and perhaps as much as 100 pounds of N per acre should be applied at planting, followed by one to three applications of 50 to 60 lbs of N/acre in winter and spring. When annual ryegrass and a legume are planted together, around 60 pounds of nitrogen are typically applied at or near planting, but addition of N later in the winter or spring may be unnecessary if the legume makes up more than 30% of the ground cover.

Annual ryegrass is typically planted in late summer or autumn, although it can be spring-planted in the northernmost states in the



## Differences in Annual and Perennial Ryegrass

Annual ryegrass can be distinguished from perennial ryegrass by observing differences in some plant parts. For example, annual ryegrass seeds are smaller than perennial ryegrass seeds. Perennial ryegrass usually has no awns on the seed. Annual ryegrass plants have long, clasping auricles, while perennial ryegrass plants have short, non-clasping auricles.



Source: *Southern Forages* - With permission of the International Plant Nutrition Institute.

USA and in Canada. Prepared seedbed plantings made in late summer or early autumn allow time for more seedling growth before cold weather, but a much greater acreage is over-seeded in mid-autumn on the dormant sods of warm season perennial grasses such as bermudagrass or bahiagrass. Research has shown that annual ryegrass seed germination is best when the average minimum temperature is around 75 degrees F or lower.

The optimum planting technique is to drill the seed of annual ryegrass, but broadcasting seed is widely practiced with good success. It is advisable to use a cultipacker or roller to firm the seed into the soil when broadcasting seed on a prepared seedbed. When over-seeding a warm season grass sod, it is important to have the summer grass grazed or clipped to no more than a one- to two-inch height and to delay planting until the summer grass is dormant. Light disking of tight sods facilitates stand establishment if seed is to be broadcast, but this practice slows spring growth of the warm season grass. When planted in a mixture with other species, 15 to 20 pounds of annual ryegrass seed are commonly planted per acre, but in pure stands 25 to 30 or more pounds per acre are often used. There are approximately 224,000 annual ryegrass seeds per pound. Ideally, seed should be planted about ¼ inch deep and no deeper than ½ inch.

## Varieties

A large number of annual ryegrass varieties are commercially available and they vary considerably with regard to a number of important traits. Numerous universities conduct annual ryegrass variety trials that provide excellent comparisons of performance with regard to dry matter yield, distribution of forage growth (including heading date), disease resistance and other characteristics. Winter hardiness varies greatly among varieties. Consequently, the farther north annual ryegrass is to be grown the more important this trait becomes.

Most annual ryegrass varieties are diploids that have 14 chromosomes (the individual units that carry genetic material), but some commercially-available tetraploid types have 28 chromosomes. Tetraploid varieties tend to produce larger plants that have wider leaves but may or may not yield better than diploids.

## Management

Ready availability of nitrogen (N) to annual ryegrass plants is a major factor in obtaining good production. The need to apply N is affected by planting date, geographical location, soil type and whether or not a legume companion is grown with annual ryegrass. Planting in late summer or early autumn, especially with a small grain companion, provides a longer growing season than overseeding annual ryegrass on a warm season sod. Typically, N is applied in at least two, and sometimes as many as four, applications of 50 to 70 pounds of N/acre each during the growing season. Split applications are especially advisable on deep, sandy soil.

In stands of annual ryegrass or a ryegrass/small grain mixture, a total of at least 120 to 150 pounds of N are typically applied during the growing season. Annual ryegrass growth slows substantially when average temperatures drop below about 45 degrees F, so in areas where winter temperatures rarely get below this level annual ryegrass provides a long growing season. Research suggests that under such growing conditions optimal production is obtained when a total of 200 pounds or more of N/acre is applied during the growing season. If a legume is grown with annual ryegrass, application of additional N can be minimized or even omitted later in the season depending on the percent of legume cover and the need for additional forage growth.

In order to prevent damage to seedlings as a result of hoof damage or plants being pulled up, it is best to initially exclude animals from a young annual ryegrass stand. Prepared seedbed plantings that are particularly vulnerable to damage should normally have at least 6 to 8 inches of growth before being grazed. A stand should not be grazed closer than about 3 to 4 inches. The rate of growth of annual ryegrass varies significantly during the growing season, so altering the stocking



rate or rotating animals can be quite beneficial. If animals are rotated out of a pasture, it is appropriate to give them access to the available forage when it reaches a height of 6 to 10 inches followed by grazing no closer than 3 to 4 inches.

The forage can be cut for hay or haylage (including baleage) but it has a high moisture content and may dry more slowly than other forage grasses. Depending on the nutritional requirements of the animals to which the forage will be fed it should be cut at the boot to early flowering stage. Annual ryegrass forage declines quickly once it has headed so prompt harvest is important. Ryegrass hay deteriorates substantially if stored outside and thus should always be protected from the elements.

Annual ryegrass can be managed for reseeding but this requires excluding grazing animals or greatly reducing the stocking rate when seedheads begin to appear. In addition, a field in which reseeding is desired will need to be grazed or clipped closely and/or disked lightly in autumn when perennial grasses have stopped being competitive. If annual ryegrass seed is used in crop rotations, unwanted reseeding may be a problem.

## PERENNIAL RYEGRASS

### Description and Origin

Perennial ryegrass is a cool season bunchgrass native to Europe, Asia and North Africa. Its use in the USA has been primarily for turf but interest in it, and opportunity for using it as a forage crop, is increasing. Perennial ryegrass has short, non-clasping auricles and the seed has no awns. There are approximately 330,000 seeds per pound. It has a branched root system with adventitious roots at the basal nodes of tillers. The inflorescence is a "spike" with awnless spikelets. Leaf blades are narrow and folded in the bud. It is cross-pollinated.

Perennial ryegrass is more persistent than annual ryegrass but less persistent than tall fescue. It tillers more profusely than annual ryegrass but is lower growing and will not form a seedhead in the establishment year. There are diploid (two sets of chromosomes) and tetraploid (four sets of chromosomes) varieties of perennial ryegrass. Tetraploids have longer tillers, longer seedheads and wider leaves. Tetraploid varieties tend to be taller and less dense. Because they have a more open sod (less ground cover) they are better suited to be grown in mixtures with legumes. Tetraploids are more digestible, have more soluble sugars and generally perform better than diploids during grazing. However, diploid types are usually more persistent and more tolerant of heavy grazing.

### Perennial Ryegrass at a Glance

<b>Origin:</b>	Europe, Asia, North Africa
<b>Characteristics:</b>	Short-lived perennial bunchgrass. Shiny, dark green, smooth leaves. Grows 2-3 feet tall
<b>Uses:</b>	Pasture, hay, silage, conservation and turf
<b>Seed:</b>	330,000 seeds/lb, 24 lbs/bushel
<b>Seeding rate:</b>	15-30 lbs/acre
<b>Seeding depth:</b>	¼-½ inch
<b>Harvest Hay/Silage:</b>	Boot to early head
<b>Grazing:</b>	Begin at 8-10 inches; graze to 3-4 inches
<b>Usual Yield:</b>	2-5 tons dry matter/acre

*continued*

## Adaptation and Use

Perennial ryegrass is popular in many turf situations because it germinates rapidly, establishes quickly and has aesthetic appeal. However, its use for forage has been limited by temperature extremes. Since the species is primarily adapted to temperate climates, it historically has not been productive and/or persistent during cold winters in the North or hot summers in the Lower South. Advances in variety development have expanded its use beyond its historical adaptation area and with continued breeding efforts its zone of adaptation will likely continue to expand in the future. At present approximately 250,000 acres are grown in the USA.

Perennial ryegrass has the potential to produce high yields of excellent quality forage and can be used for pasture, hay, silage, turf and conservation purposes. It is easy to establish and can be grown in mixtures with legumes such as alfalfa, white clover and red clover.

## Establishment

Perennial ryegrass can survive in a wide range of soil and climatic conditions; however, it grows best on well-drained, fertile soils. The first and most important agronomic and economic investment in ryegrass production is a soil test. Phosphorus and potassium should be in the medium range and the soil pH should be between 6.2 and 6.8 for optimum production and persistence. When seeded with legumes, nitrogen is not required. In pure stands, add 40-60 pounds of N per acre depending on planting date and expected growth during late fall and winter. For late-winter early-spring seeding, use 50-60 pounds of N per acre.

Use high quality seed of a variety capable of producing and persisting in your area. Many states conduct variety tests that provide information about which varieties have performed well in a given area.

Depending on location, seedings can be made from early August through October. Earlier plantings are best for fall and early winter grazing possibilities. Plantings can also be made from March to early May. Seedings can be made into prepared seedbeds or no-tilled into killed sods or crop residues. When seeding into a prepared seedbed, use of a cultipacker-seeder or broadcasting seed followed by cultipacking has been very successful. Regardless of seeding method, seed should be planted at the optimum rate and placed at a depth of ¼-½ inch in good seed-to-soil contact. Reduce seeding rate when seeding with a legume. Monitor a new stand and control any troublesome weeds and insects during establishment.

## Summary

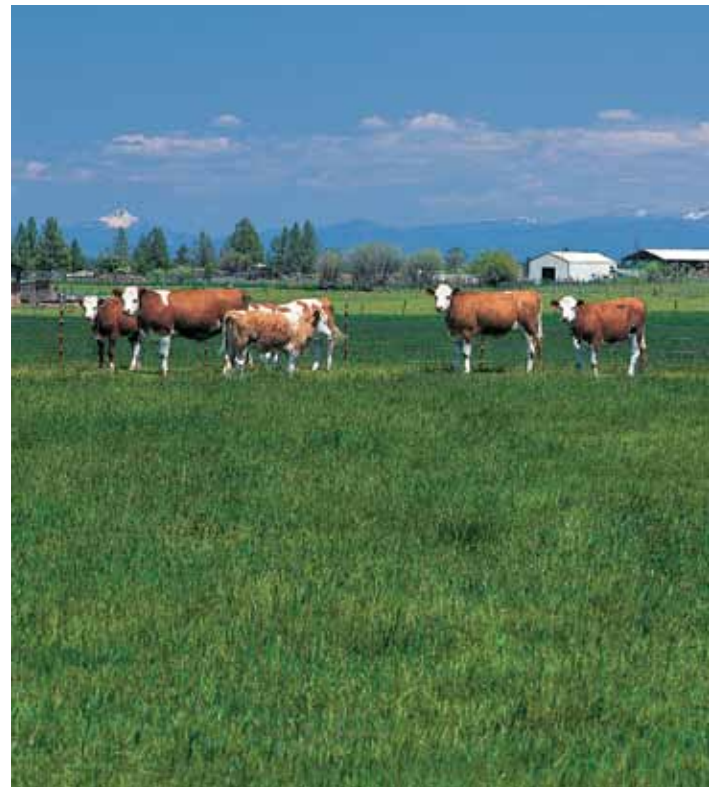
Annual ryegrass and perennial ryegrass produce highly digestible and palatable forage. The forage of both of these grasses can support high dry matter intake levels and are suitable for animals with high nutritional requirements, including lactating dairy cattle. With good fertility both species provide rapid growth during periods of cool

## Management

Perennial ryegrass is recognized as one of the highest quality cool-season grasses. In a vegetative (leafy) stage it is high in protein, highly digestible and capable of supporting high dry matter intake levels and excellent animal performance. It is quite palatable to grazing animals. Animals will often select it over other species in a pasture system. When harvested in the boot to early head stage for hay or silage, quality as measured by protein, digestibility and animal performance is high.

In addition to adequate phosphorus and potassium, nitrogen is required when ryegrass is grown without legumes. Rates and dates of application will vary but typically range from 50 to 60 pounds per acre. More than one application may be needed depending on length of growing season and yield goal.

Insects and diseases are usually not major problems in the USA. It can be susceptible to certain leaf diseases such as crown rust and insects such as armyworms that attack other cool season grasses.



temperatures and when sufficient levels of soil moisture are available. Ryegrasses are relatively easy to establish and are versatile in their usefulness. They are outstanding forage crops that have a fit in many production systems in the USA.



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