

## Annual Ryegrass<sup>1</sup>

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### Introduction

There are two species of ryegrass that are grown in the United States: perennial (*L. perenne* L.) and annual (*Lolium multiflorum* Lam.). Perennial ryegrass is seldom planted in the Southern Coastal Plain because it is poorly adapted. Annual ryegrass, sometimes called “Italian” or “English” ryegrass, is native to southern Europe. It is widely grown in the southern U.S. and has become an important component in winter forage-livestock systems. Annually, more than one million hectares of annual ryegrass are grown in the Southeast, from eastern Texas and Oklahoma to the southern East Coast.

Ryegrass is adapted to many soil types and a widerange of soil pH. Optimum growth generally occurs at pH 5.6 or higher. Ryegrass variety development in the U.S. has concentrated on improving forage yield, seed production, disease resistance and cold tolerance. Through plant breeding and selection, annual ryegrass has become a highly valued and productive cool-season forage.

### Plant Description

Annual ryegrass is a bunch-type grass that tillers profusely. The plant appears shiny, dark green and grows to a height of 2 to 5 feet. It has a deeply fibrous root system, erect culms, glabrous leaves and a spike-type inflorescence. The inflorescence is composed of about 35-40 sessile spikelets arranged alternately, with 10-20 fertile florets per spikelet. Awns are usually present and attached to the lemma.

While annual ryegrass is generally considered to be an annual specie, it has on occasion behaved as a short-term perennial or biennial. It does exhibit a response to day-length, and flowering habit varies with variety and latitude. Vernalization (cold treatment) is not required for normal growth or for seed production of adapted cultivars.

### Cultivars

Both diploid and tetraploid cultivars of annual ryegrass exist. Tetraploid cultivars have twice as many chromosomes as diploid types, and haswider leaves and appear more robust.

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Recent yield data suggests that newer tetraploid cultivars are at least equal to, and may have some yield advantage over, their diploid relatives. Two high yielding tetraploid ryegrass cultivars are “Big Daddy” (1995) and “Jumbo” (2000), recently released by the University of Florida IFAS Ryegrass Breeding Program.

Early varieties included “Gulf”, “Florida Rust Resistant”, and “Marshall”. Gulf, released by the Texas USDA-AES in 1958, had improved crown rust resistance and was higher yielding than “common” ryegrass. “Florida Rust Resistant” was released in 1965 by the Florida AES, and “Marshall”, in 1980, by the Mississippi AES. The University of Florida has taken an active role in annual ryegrass improvement. Many commercially available varieties are Florida varieties, or have with Florida breeding lines in their pedigrees. The Florida program has produced or contributed to developing the following varieties: “Florida 80” (1982), “Surrey” (1989), Big Daddy, “Stampede” (1998), “Natchez” (1999), “Fantastic” (1999), “Florlina” (1999), Jumbo, “Passeral Plus” (2000), “King” (2000) and “Graze-N-Gro” (2000). Variety selection is important and should be based on reliable, unbiased information. Annual ryegrass variety trials are conducted at universities throughout the southern U.S. and results of these trials are available to the public. Table 2 includes a list of commercially available ryegrass varieties. Reports from Florida and Georgia variety testing are available at the University of Florida and University of Georgia web sites:

<http://agronomy.ifas.ufl.edu/>

<http://www.swvt.uga.edu/>

## **Production and Management**

Establishment depends on whether the ryegrass is planted on a prepared seed bed or is overseeded into dormant permanent pasture. In general, ryegrass is planted at a rate of 20-35 lb/A when seeded in a pure stand, or 10-15 lb/A when seeded in mixtures with other cool-season forages. Higher seeding rates will improve early forage production, but may not be economical unless forage is intended for dairy cattle, stocker cattle or replacement heifers. October and November are generally optimal months to seed

ryegrass in Florida, but successful planting may occur into December. IFAS Extension recommends planting from Oct. 1-Nov. 15. Seed should be planted at a depth of no more than one-half inch. Cultipacking or dragging the soil following seed application/distribution, is recommended to establish good seed-to-soil contact.

The peak season of forage production for ryegrass is later than that of oats or rye. Seasonal production in areas receiving adequate rainfall, generally along the Gulf Coast, occurs from November to May. When planted late, overseeded into perennial grass pastures, or in areas of low rainfall, production will generally be delayed until February, but may continue through May. In general, the warmer the location where the ryegrass is planted, the shorter the growing season.

Often ryegrass is used in mixtures with other cool-season forages to extend the winter grazing period. Planting mixtures of ryegrass with other forages on a prepared seed bed is advantageous because ryegrass is competitive with small grains, such as rye or oats, and will establish itself. Although small grains are the faster growing component of the blend and provide earlier grazing, they decline in late winter when ryegrass production peaks. The result is an extension of cool-season forage production with high quality ryegrass forage.

Many livestock producers do not have open land available for prepared seed beds. Often, perennial summer grass pastures of bahiagrass or bermudagrass are overseeded in the fall, as the summer grass begins to go dormant. Overseeding of warm-season grasses may delay the planting until November or December, due to competition of the perennial summer grass with ryegrass for soil moisture and nutrients. Often, producers wait until a first frost to seed. This delay in overseeding generally results in later ryegrass production, and total tonnage will be reduced. Lightly disking the summer grass pasture prior to overseeding will improve the ryegrass stand and promote earlier grazing.

Ryegrass grows well during the mild winters in Florida. Extremely cold weather will decrease the growth of the plant although, some varieties have better cold tolerance than others. Therefore, selection

for improved cold tolerance is a major objective of the University of Florida's Ryegrass Breeding Program. Marshall has long been considered the best cold-tolerant ryegrass available commercially. However, it is susceptible to crown rust and gray leaf spot and does not yield as well as many of the newer varieties, especially in peninsular Florida.

Ryegrass is very responsive to nitrogen and water availability. Forage yield is enhanced with additional N applications and irrigation. Typical yields from non-irrigated ryegrass are 2-4 tons dry matter/A. Ryegrass can be grazed when plants reach an approximate height of 6-8 inches. Animals can graze the forage as low as 2-4 inches, which allows sufficient leaf area remaining for regrowth. Fertilization recommendations should be based on laboratory results of a soil analysis. [General recommendations at planting include 30 lbs N/A, 50% of the recommended  $K_2O$  and all of the  $P_2O_5$  fertilizer.] After the first grazing or hay harvest, apply 50 lbs N/A and the remaining  $K_2O$ . Top-dressing with 50 lbs N/A after each additional grazing or hay harvest, except at the end of the season, is recommended for the productivity of the ryegrass.

### **Colder season ryegrass growth**

Annual ryegrass, planted in Piedmont and colder locations of the Southeast ryegrass belt, requires similar cultural treatment as warmer areas. The growing season is longer, so fall planting is earlier, generally early to mid-September. Spring growth of annual ryegrass will also be later and may continue producing forage until June.

It is important to plant cold tolerant ryegrass cultivars early enough in the fall so that plants are well established before the lowest cold temperatures of the season occur since they may damage or completely kill plants. Do not use high rates of N fertilizer just prior to or during the coldest part of winter. Because the growing season is extended, a higher season total of fertilizer is often needed, and more applications will be necessary.

### **Forage Quality**

Annual ryegrass is considered to be one of the highest quality winter forages utilized in the

southeastern U.S. Dry matter digestibility is generally greater than 65%, and crude protein content exceeds the requirements for most classes of livestock animal gains. Because ryegrass is highly palatable, livestock may over consume. Avoid turning hungry animals directly onto lush ryegrass pastures. Use hay as a filler prior to grazing until animals have adjusted to the new diet. Also, consider providing hay while animals are grazing ryegrass. While ryegrass is extremely tolerant of close grazing by livestock, rotational grazing gives the grazed pasture time to regrow and allows for more efficient utilization of the forage.

In years of excess forage production, ryegrass may be cut for hay, haylage or silage. Some producers will grow ryegrass or mixtures of ryegrass, small grains and clovers specifically for hay or silage. Several dairies in Florida economically winter their herds on green-chopped ryegrass resulting in excellent milk production.

### **Seed Production**

Most ryegrass seed is produced in the Willamette River Valley of Western Oregon. Many of the commercially available certified varieties are produced in that region. Seed production of ryegrass is not usually considered for the southern U.S. because seed yields are significantly reduced compared with those observed in Oregon, mostly due to our warm climate and rainfall distribution. Ryegrass, however, can reseed well in the southern U.S. if properly managed to allow the plant to produce viable seed. Animals should be removed from the pasture when seed heads appear, usually in April. Once seed matures and begins to shatter, animals may resume grazing the ryegrass stubble when overseeded. It is critical that surplus ryegrass and other winter forages are removed timely, either by grazing, haying or mowing. Not removing the winter forage may result in lower yields or death of the perennial summer grass sod from competition for sunlight, nutrients, and moisture by the winter forage crop.

## Pest Control

Insect pests of ryegrass include fall armyworms (*Spodoptera frugiperda* J.E. Smith) and mole crickets (*Scapteriscus* spp.) which attack young seedlings. Delayed planting minimizes damage from either pest.

Crown rust (*Puccinia coronata* Corda) has long been the most common disease affecting ryegrass production. Selection through breeding has improved ryegrass resistance. Early infection greatly reduces forage production. The disease is easily recognized by the bright orange-to-red pustules that occur scattered on the leaf blades, resulting in leaf chlorosis and, in some severe cases, dwarfed plants. Late infection generally does not greatly reduce forage production. Most new varieties have good to excellent crown rust resistance. Stem rust (*P. graminis* Pers.: Pers. subsp. *graminicola*, Z. Urban) is a disease that is common to Oregon and rarely seen on ryegrass grown in the southeastern U.S.

Gray Leaf Spot, caused by *Pyricularia* sp., may occur on early planted ryegrass pastures. Plants that show symptoms usually have been stressed from drought and warm temperatures in early fall. The disease dissipates with cooler weather and usually does not present a risk to forage plantings. The leaf spot tends to be round to oblong in shape, and its color may vary from tan to grey with purple or brown borders. Lesions may also form on the stem of the plant. Chlorosis and tissue death occur around the lesion and may extend to the leaf tip, or over the entire leaf. In extreme cases of infection, the lesions may spread to tillers and could result in death of the plant. Varietal differences for the disease exist and variety selection, especially for early planting, should be based on known resistance to that disease.

Regardless of the cultivar, cottony blight (*Pythium aphanidermatum* (Edson) Fitzp.) disease can attack ryegrass seedlings causing severe stand losses when soil temperature is 70° or higher. The disease activity decreases as temperatures declines in the fall; thus early plantings may be vulnerable.

Other minor diseases include Helminthosporium leaf spots (*Drechslera* spp.) which may occur on ryegrass and cause significant damage to the plant, and Barley Yellow Dwarf (BYDV), an

aphid-transmitted virus. Early planted ryegrass is more vulnerable to BYDV since warm weather has not yet caused a decline in aphid populations. Chemical control of aphids is not recommended.

Information on weed control in ryegrass may be found in the fact sheet SS-AGR-08 *Weed Control in Pastures and Rangelands*. This fact sheet is available at the web site:

<http://edis.ifas.ufl.edu/WG006>

Mixtures of ryegrass and clovers require careful consideration of chemicals that may damage the clover component of the pasture. Some herbicides, like 2,4-DB, do not harm the clovers when applied at the appropriate rate and all other labeled directions are followed.

## Summary

Annual ryegrass is considered the best quality winter forage for the southeastern U.S. Excellent animal performance on ryegrass pastures, and the extended winter grazing it supplies, make it a very desirable component of any winter forage program. The use of ryegrass for forage, hay, and silage is increasing because of its low seed cost, seed availability and wide adaptation to our southern environment. Continued improvement in commercially available varieties guarantees that ryegrass will continue to be a highly regarded winter forage plant.

**Table 1.** Characteristics of various commercial ryegrass varieties

Ryegrass cultivar	Ploidy	Maturity (flowering)	Crown rust index*	Cold tolerance
Florida 80	diploid	Early	2.3	Medium
Fantastic	diploid	Early	2.1	Medium
Gulf	diploid	Early to Mid	4.5	Low to Medium
Florlina	diploid	Mid to Late	2.5	High
Surrey	diploid	Mid to Late	2.4	High
Marshall	diploid	Late	8.1**	High
Rio	diploid	Mid to Late	2.7	High
Jackson	diploid	Mid to Late	2.5	High
Stampede	diploid	Mid to Late	2.4	High
King	diploid	Mid	2.4	Medium to High
Graze-N-Gro	diploid	Mid to Late	2.5	High
Passerel	diploid	Late	8.2**	High
Passerel Plus	diploid	Late	3.2	High
Big Daddy	tetraploid	Mid to Late	2.7	Medium
Jumbo	tetraploid	Late	1.6	Medium to High
TAM 90	diploid	Mid to Late	3.6	High
Ribeye	diploid	Mid	4.5	Medium to High
Sirloin	diploid	Mid	4.7	Medium to High
Magnolia	diploid	Mid to Late	4.6	Medium to High

\*Crown rust index is based on an average of two or more annual crown rust index ratings, where 0-3 is highly resistant, 3-5 is resistant, 5-7 susceptible and above 7, highly susceptible to crown rust.

\*\*Not recommended because of high susceptibility to crown rust