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Tall Fescue for Forage

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Origin

Tall fescue (*Festuca arudinacea* Schreb.) is grown for hay and pasture on approximately two million acres in Arkansas and is the predominant perennial cool-season grass in the United States. Fescue was introduced from Europe in the late 19th century. A strain known to exist in Kentucky before 1890 was collected in 1931 and eventually released by the Kentucky Agricultural Experiment Station as the cultivar 'Kentucky 31'.

The use and importance of fescue for forage and soil conservation grew rapidly after the release of improved cultivars during the 1940s. However, tall fescue was not officially classified as a separate species from meadow fescue (*Festuca pratensis* Huds.) until 1950. Tall fescue and meadow fescue have both been recently reclassified as *Lolium arundinaceum* Darbysh. and *Lolium pratensis* Darbysh.

Tall Fescue at a Glance

Origin.....Europe
Characteristics.....Perennial, long-lived bunchgrass, panicle seedhead, 2-4 feet tall; most older fields infected with endophyte; low endophyte and novel endophyte varieties available
Uses....pasture, hay, turf, erosion control
Seed.....270,000 seed/lb, 25 lb/bu
Seeding rate.....20 lb/A
Seeding depth.....1/4-1/2 in
Primary seeding date.....Sept. 1-Oct. 15
First hay harvest.....May 1-15
First grazing.....Mar. 15 - April 15
Typical yield.....2-4 T/A/yr

Description and Uses

Tall fescue is a deep-rooted, upright, coarse-leaved, perennial cool-season grass. Leaves are long and dark-green with distinct veins and rough edges. It is considered a bunchgrass, but most types have short rhizomes and will form a dense sod when kept mowed or grazed. Height at maturity ranges from 2 to 4 feet. The typical forage yield range is 2 to 4 tons dry matter per acre.

Fescue is adapted to a wide range of conditions. It tolerates short-term flooding, moderate drought and heavy livestock and machinery traffic. It responds well to fertilizer but maintains itself under limited fertility conditions. It is well adapted to moderately acid and wet soils. In south Arkansas, fescue is best adapted to wetter soils and does not persist well on droughty upland soils or deep sandy soils. In northern Arkansas, it is very persistent across a wide range of conditions. On favorable sites, stands of tall fescue can persist indefinitely under good management, with some fields in Arkansas and Missouri being 30 to 50 years old.

Tall fescue is used mainly for pasture and hay. Approximately two-thirds of the annual growth of tall fescue occurs during spring and about one-third occurs during summer and fall. Maximum growth rate occurs between 68° and 77°F. Growth rate declines sharply at temperatures above 86°F and ceases below 40°F. Fescue should not be solely relied upon for year-round

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grazing because growth slows considerably or ceases during summer. Under good management, mixtures of fescue can be grown with warm-season forage species such as bermudagrass, crabgrass or lespedeza to extend grazing through summer.

Endophyte

Animal performance on tall fescue pastures has often been poor relative to other cool-season grasses. The poor performance is caused by toxins produced by an endophytic (endo = inside, phytic = the plant) fungus, *Neotyphodium coenophialum*, found in fescue plants in most Arkansas pastures. The endophyte's toxins cause "fescue toxicosis" in grazing livestock. Symptoms of fescue toxicosis in cattle include reduced feed intake, elevated body temperature, high respiration rate, reduced animal gain and milk production, lower conception rate, rough hair coat and overall unthrifty appearance. Brood mares are especially sensitive to the toxins and should not be allowed to graze toxic fescue several months before foaling. Toxins from the endophyte build up in the seed as the plant matures, which makes seedheads the most toxic part of the forage. Management to reduce fescue toxicosis is discussed in detail in FSA2140, *Friendly Endophyte-Infected Tall Fescue for Livestock Production*.

Although the endophyte's toxins cause livestock disorders, the endophyte improves persistence of the plant by increasing tolerance to drought, insects, nematodes and mismanagement. Endophyte-free cultivars alleviate fescue toxicosis symptoms, but many of them are less tolerant of drought and heavy grazing pressure. Replacing toxic endophyte-infected fescue with endophyte-free fescue is an option; however, many endophyte-free cultivars do not persist well in Arkansas except where careful attention is paid to grazing management and on less droughty soils. Certain strains of fescue endophyte have been found that do not produce the toxins that cause fescue toxicosis. These strains have been added to improved fescue cultivars to produce endophyte-friendly cultivars that have both good persistence and produce good animal performance. Characteristics of several fescue cultivars are shown in Table 1.

Establishment

The best time to plant tall fescue is from early September through mid-October. Early spring seedings can be successful but are seldom recommended because of susceptibility to summer drought and weed competition. Good seedbed preparation and seed placement are especially important for successful establishment. For pure stands, plant 20 pounds per acre of pure-live seed (PLS) in a prepared moist seedbed that has been limed and fertilized according to a soil test. Under ideal conditions and planting practices, the seeding rate can be reduced by 25%, but for broadcast seedings or when planting during less than ideal conditions, the seeding rate should be increased by 25%. Planting with a no-till drill is successful if the existing sod and weed competition is controlled. Application of nonselective herbicides can be used for sod control before no-till planting. With any planting method, seed should be planted shallow (1/4- to 1/2-inch deep) and the soil should be firmed around the seed for close seed-soil contact. For fall-established stands, growth is usually adequate for grazing or hay harvest to begin the following mid- to late spring. Spring-established stands might not develop sufficiently before summer, so grazing or hay harvest may be delayed until fall.

Nitrogen (N) fertilization during fall establishment should not exceed 40 pounds per acre, and only if weed competition is low. An additional 40 to 60 pounds per acre in spring can ensure a good hay yield.

Management

Grazing—Because most forage growth occurs during spring, it is important that fields be managed properly for best quality and yield. Growth is most rapid from mid-April through mid-May, and mature seed is produced by June. Fescue tolerates close continuous grazing, but yield and regrowth rate is improved when rotational grazing is used. Rotational grazing also improves persistence of white clover in fescue stands. On farms with enough cross fencing and water sources to accommodate at least four to six separate pastures, rotational grazing can be accomplished by simply closing gates and moving cattle as needed to maintain good pasture growth. On large fields, control of the grazing system can be improved by further dividing the pasture with a single temporary electric fence wire.

The goal for grazing is to use alternating grazing and rest/regrowth periods to keep the pasture in a leafy growing condition as long as possible. In fields that are too large or with too few cattle, the animals will tend to spot-graze as the forage becomes more mature. Cattle will regraze spots previously grazed while leaving ungrazed areas to become more mature, toxic (if endophyte-infected) and unpalatable. Palatibility of the forage declines as the forage matures, and cattle will avoid grazing stemmy coarse forage during summer.

Rotational grazing is especially important for maintenance of endophyte-free fescue cultivars because cattle tend to overgraze them more than toxic fescue. A minimum stubble height of 3 to 4 inches should be maintained for these varieties, and grazing during summer should be avoided or done sparingly to prevent stand loss.

Table 1. Characteristics of several commercially available tall fescue cultivars with company descriptions.

Variety	Producing Company	Dry Matter Yield Range[1] (% of KY-31)	Endophyte Status[3]	Characteristics
AU Triumph	DLF-International Seeds	89-125 (10)[2]	E-	Released by Auburn University in 1981. Matures 2 weeks earlier than KY-31. Good fall/winter production. More dormant than KY-31 in summer.
Baraine	Barenbrug USA	74-115 (4)	E-	Matures 2 to 3 weeks later than KY-31. Fine, soft leaves. Rust resistant. Dense, prostrate growth.
Barolex	Barenbrug USA	86-95 (2)	E-	Matures 2 weeks later than KY-31. Fine, soft leaves. Rust resistant. Dense, prostrate growth.
Bronson	Ampac Seeds	52-109 (9)	E-	Early maturity. Soft leaves. Tolerant of tough growing conditions. High quality.
Bull	DLF-International Seeds	62-109 (7)	E-	Medium maturity. Bred for wide range of adaptation. Recommended for hay/rotational grazing.
Enhance	Allied Seed	104-139 (3)	E-	Released 2004. Medium maturity.
Fawn	Public-various	76-104 (5)	E-	Released 1964. Medium maturity. Good seed production. Susceptible to crown and leaf diseases. Low persistence in AR tests.
Fuego	Seed Research of Oregon	89-101 (4)	E-	Released in 1990. Late maturity. Soft leaves. Lower lignin.
Hoedown	DLF-International Seeds	72-103 (6)	E-	Bred for winter hardiness and drought tolerance. Selected for low set crown to improve grazing tolerance. Stem density is low-medium.
Jesup MaxQ	Pennington Seed, Inc.	87-116 (17)	E+	Nontoxic endophyte-infected cultivar. Medium-late maturity. Good persistence and animal performance.
KY-31	Public-various	100	E+	Released 1943. Early-medium maturity. Toxic endophyte-infected. Low animal performance. Persists under wide range of conditions and management.
Seine	Seed Research of Oregon	87-123 (3)	E-	Medium-late maturity. Soft leaves.
Select	Proseeds Marketing	74-116 (10)	<5% E+	Medium-early maturity. Good persistence and drought tolerance. Good performance in KY grazing tolerance tests with horses.
Stag	Proseeds Marketing	88-114 (6)	E-	Earlier maturing than KY-31.
Stockman	Seed Research of Oregon	78-112 (8)	E-	Released 2002. Medium maturity.
Tuscany II	Seed Research of Oregon	88-102 (2)	E-	Medium maturity. Well suited to the transition zone and northern U.S.

[1] Yield comparison is calculated as a percentage of the yield of the KY-31 cultivar based on data from University tests in Arkansas, Kentucky, Mississippi, Texas, and Wisconsin.
[2] Numbers in ( ) indicate number of years for that variety and KY-31 in the same test.
[3] E+ = endophyte infected; E- = endophyte free

A major advantage of tall fescue is that fall growth can be stockpiled to provide excellent winter grazing. In a four-year Arkansas demonstration project, producers saved an average of $12.52 to $29.07 per animal unit (1,000-pound dry cow) by grazing stockpiled fescue during winter compared to feeding hay. Fescue can be stockpiled by clipping or grazing fields to a 3-inch stubble by early September and applying 50-60 pounds N per acre before September 15. High-quality, leafy, non-stemmy fall growth is allowed to accumulate until December when grazing can begin.

Strip grazing stockpiled pastures has been shown to double the number of grazing days per acre compared to continuous grazing. Strip grazing is accomplished by using a single temporary electric wire to provide strips of fresh pasture and to limit cattle access to the remaining forage. In continuous

grazing, cattle have access to the entire stockpiled pasture, and trampling causes a high percentage of forage to be wasted. Moving the electric wire usually takes less than 30 minutes, and most producers prefer to move the electric wire twice a week. This gives a tremendous time savings over feeding hay.

Hay—For highest yields of acceptable quality hay, make the first harvest when the plants' seedheads are in the boot to early heading stage of growth. Subsequent cuts will be nearly all leafy growth with no seedheads and can be made depending on rainfall and growth. Often, producers harvest fescue hay after it has become mature to obtain higher yield and to avoid rain damage that might occur earlier in the spring. This results in poor-quality hay that contains large amounts of toxic fescue seed. Early-cut hay will be leafier and more digestible, and it will be consumed in larger amounts than late-cut hay. Cutting fescue earlier allows the chance of a second cutting (in early- to mid-June) of high-quality leafy hay. Delaying harvest until maturity leads to low forage quality and eliminates the chance of a second spring cutting.

Fertilization—Fertilizers, especially N, are necessary for good fescue production. Test soil periodically to monitor pH, phosphorus (P) and potassium (K) levels and to determine if lime and fertilizer topdressings are needed. Fertilization should match the production system. It is not economical to apply fertilizer to all pastures if not enough livestock are present to graze the forage or if hay will not be harvested. It may be more efficient to split fertilizer applications between spring and fall to spread out pasture production and to reduce winter hay feeding. For pasture, apply the recommended rates of N, P and K in late February to early March. For higher production and if moisture conditions are favorable, apply an additional 50 pounds N/acre after every 4 to 6 weeks of grazing. For fall/winter grazing, apply 50 pounds N/acre in early September.

For hay production up to 2 tons per acre, apply the recommended rates of N, P and K in late winter at spring green-up. For yield up to 3 tons per acre, apply one-half the recommended N, P and K at green-up and apply the remaining one-half after the first hay cutting. For hay yield above 3 tons per acre and for optimum fertilizer use efficiency, divide the recommended rates of N, P and K by the estimated number of hay harvests/per year and apply fertilizer in split applications beginning at green-up and following each hay harvest.

Cultivar Selection

Selection of a fescue cultivar (variety) should be based on the environment where the grass will be grown, animal requirements and the level of management. Persistence of the stand is important. **Endophyte-free varieties will not persist if grown under harsh conditions or continuous grazing management.** However, with good management and when high animal gain, milk production or brood mares are considered, endophyte-free or endophyte-friendly varieties should be emphasized. A non-inclusive list of available tall fescue cultivars with characteristics and endophyte status is shown in Table 1. Cultivars not listed may also be adapted to Arkansas growing conditions. Ranges of dry matter yield for each cultivar are shown as a percentage based on the yield of each cultivar compared to the yield of Kentucky 31 where both cultivars were in the same test.

More information on tall fescue seed producers and handlers can be obtained through the Oregon Tall Fescue Commission web segment of the Forage Information System at http://forages.oregonstate.edu/organizations/seed/otfc/default.cfm. More information on the biology and management of tall fescue can be accessed in the *Tall Fescue On-line Monograph* at http://forages.oregonstate.edu/is/tfis/.

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