

Tall Fescue for Forage

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Origin

Tall fescue (*Festuca arundinacea* 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.

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 bunch grass, 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 and is excellent for soil conservation and erosion control. 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

Tall Fescue at a Glance

Origin..... Europe
Characteristics..... Perennial,
..... long-lived
bunch grass, 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 ¼-½ 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

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and ceases below 40°F. Fescue should not be solely relied upon for year-round 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

The fescue variety KY-31, the most commonly grown cultivar in Arkansas, is infected with a toxic endophyte which causes poor animal performance relative to other cool-season grasses. The poor performance is caused by toxins produced by the endophyte fungus (endo = inside, phyte = plant), *Neotyphodium coenophialum*, that grows inside the plant. The endophyte's toxins cause "fescue toxicosis" in grazing livestock. Symptoms of fescue toxicosis in cattle include reduced feed intake, elevated body temperature (which causes cattle to stand in ponds), 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 are not recommended in Arkansas because they are less tolerant of drought and heavy grazing pressure. 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 or "novel endophyte" cultivars that have both good persistence and produce good animal performance.

Cultivar Selection

A common question is about which variety of fescue to plant. 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. KY-31 fescue is the most commonly grown variety due to its persistence under harsh conditions even though animal performance is often low due to the toxic endophyte.

Novel endophyte varieties should be considered when high animal gain, milk production, improved conception rates, improved weaning weights or brood mares are important. **The novel endophyte fescue varieties should not be confused with fungus-free or endophyte-free fescue. Endophyte-free fescue has no endophyte, has poor field persistence and is not recommended for forage in Arkansas.** Seed cost of novel endophyte fescue varieties is higher than for KY-31, but the increased animal conception rates and weight gain will usually pay the difference. Currently available novel endophyte fescue varieties (as of 2020) include MaxQ (2001, Pennington Seed, Madison, Georgia), Texoma MaxQ II (2011, Pennington Seed), BarOptima (2009, Barenbrug USA, Tangent, Oregon), Estancia with ArkShield (2011, Mountain View Seeds, Salem, Oregon) and Martin II Protek and Tower Protek (2011, DLF International, Halsey, Oregon). Most agricultural suppliers can order these novel endophyte varieties through regional seed distributors. All of these have been grown in Arkansas research trials and have proven to persist and provide good animal performance. Studies at the Livestock and Forestry Research Station at Batesville show that average daily gains of stocker calves grazing novel fescue is as good as those grazing ryegrass and the total grazing season for novel fescue is much longer than for ryegrass. Good management is important for maintaining stands of novel endophyte fescue.

Establishment

Renovating or Thickening Stands—If the goal is to thicken a thin stand of existing KY-31 fescue, then just add more KY-31 fescue, but consider adding clover with it if the soil fertility is good enough for clover. You can also sow orchardgrass in the field to add a nontoxic forage to the pasture. Since orchardgrass can be visually distinguished from fescue, its contribution and persistence can easily be monitored. When it thins out after a few years, more can be added again if needed.

If a novel endophyte fescue is desired, then the existing KY-31 fescue must be killed before planting the novel endophyte variety. The spray-smother-spray renovation process is the most effective and involves spraying a nonselective herbicide like glyphosate to kill the old fescue, planting an annual smother crop like small grain or pearl millet and spraying again after the annual crop is harvested before planting the new fescue variety in the fall.

The best time to plant tall fescue is from early September through mid-October. Early spring seedings

can be successful but are susceptible to summer drought and weed competition and are not often recommended. Good seedbed preparation and seed placement are 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 percent, but for broadcast seedings or when planting during less than ideal conditions, the seeding rate should be increased by 25 percent. 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 ($\frac{1}{4}$ - to $\frac{1}{2}$ -inch deep) and the soil should be firmed around the seed for good seed-to-soil contact. For fall-established stands, grazing or hay harvest can begin the following mid- to late spring. Spring-established stands might not develop sufficiently before summer, so grazing or hay harvest may not be feasible until fall. Nitrogen (N) fertilization during fall establishment should be about 30 to 40 pounds per acre. An additional 50 to 60 pounds per acre applied in spring can ensure a good grazing or 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. Well-established fescue tolerates close continuous grazing, but yield and regrowth rate is improved when rotational grazing is used. Rotational grazing also improves persistence of 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 rotational 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 regrazed spots previously grazed while leaving ungrazed areas to become more mature, toxic (if endophyte-infected) and unpalatable. Palatability 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 novel endophyte 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 during spring and fall, and grazing during summer should be avoided or done sparingly to prevent stand loss. A stubble height of at least 4 to 6 inches should be maintained during summer.

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 to 60 pounds N per acre before September 15. High-quality, leafy 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 management, cattle have access to the entire stockpiled pasture, and trampling causes a high percentage of forage to be wasted. Moving a temporary electric wire usually takes only a few minutes. Most producers prefer to strip graze in a manner so the electric wire is moved twice a week to offer a new strip of forage. This gives a tremendous time savings over feeding hay.

Hay—For highest yields of acceptable quality hay, make the first harvest when the plants are in the boot to early heading stage of growth. This usually occurs in early to mid-May. Often, producers harvest fescue hay in June 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 in May allows the chance of a second cutting (in early to mid-June) of high-quality leafy hay that is free of seedheads. Delaying harvest until forage maturity leads to low forage quality and eliminates the chance of a second spring cutting.

Fertilization—Fertilizers, especially nitrogen, are necessary for good fescue production. Test soil every 2 to 3 years 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 spring production, apply the recommended rates of N, P and K in late February to early March. For higher production and if moisture and temperature conditions are favorable, apply an additional 50 pounds N/acre after every 4 to 6 weeks of grazing or after early hay harvest during the spring season. For fall/winter grazing, apply 50 to 60 pounds N/acre in early September.

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