Cattlemen typically simplify their pasture management by relying on one or two forages that are well adapted and persist under their targeted levels of management and production. The 5.5 million acres of Kentucky-31 tall fescue in Kentucky is a strong indication how producers in the state rely on the cool-season perennial grass, sometimes in mixture with red or white clover, to meet their grazing needs. An advantage of this approach is that fertilization and grazing management is based on a single growth distribution and set of fertilizer needs. Disadvantages are that yield, growth distribution, and quality of forage may not meet targeted levels of cattle production, and that hay and costly concentrate supplements will be needed during lengthy periods of dormancy and inactive growth. Furthermore, dependence on endophyte-infected tall fescue as the sole pasture forage greatly increases vulnerabilities to fescue toxicosis, fescue foot, and fat necrosis, maladies caused by ergot alkaloids contained in endophyte-infected tall fescue.

Kentucky is located in the transition zone between the temperate north and subtropical southeast, which allows its producers an opportunity to maximize the annual distribution of forage by utilizing both high-quality cool-season grasses and productive warm-season grasses. Producers can plant pastures with different grasses and clovers that vary in their seasonal growth patterns and, therefore, provide forage growth for most of the year and cost effectively reduce a need for hay and supplemental feed. Three examples of forage systems with potential use in Kentucky will be presented and discussed. Considerations when choosing a stocking rate and grazing method also will be discussed.

**Forage System: Kentucky-31 Tall Fescue, Novel Endophyte Tall Fescue, and Bermudagrass**

This system utilizes both cool- and warm-season grasses to reduce the gaps in forage production. Although clover is not mentioned as a component of the system, over seeding clovers into both cool- and warm-season grasses is encouraged to boost forage quality and reduce the need for nitrogen fertilizer.
Soils and/or terrain may limit a producer’s willingness to replace Kentucky-31 in certain pastures or areas of the farm. This is not a problem because these pastures can be restricted to stockpiling forage for late fall and winter grazing. Research conducted by the Universities of Arkansas and Missouri has shown that alkaloids produced by the fungal endophyte of Kentucky-31 are in a low concentration from late fall to early spring, which allows a management option to stockpile late summer and fall growth for grazing during the cold months when hay is typically fed. Nutritive value of stockpiled tall fescue is acceptable for dry cows, but supplemental protein and energy will be needed for other classes of cattle. Grazing of Kentucky-31 pastures in this system should be limited to fall and winter grazing to minimize the detrimental effects that endophyte-infected tall fescue can have on herd performance and health status. Stockpiling should be initiated in middle summer following fertilization. Growth in the spring and early summer should be mowed or cut for hay.

Certain acreage can be planted to a novel endophyte tall fescue. Currently, the only novel endophyte tall fescue commercially available is Jesup Max Q, but others are presently being developed for commercial release. Novel endophytes do not produce the ergot alkaloids that cause the maladies associated with the endophyte that inhabits Kentucky-31 tall fescue. Therefore, a non-toxic tall fescue can provide quality grazing in the spring and fall.

Similar to Kentucky-31, the non-toxic fescues offer grazing in the summer; however, it should be mentioned that consumption by cattle grazing non-toxic fescue is not limited by the alkaloids and, as a result, carrying capacity of non-toxic fescue pastures in the summer will likely be lower than with toxic fescue pastures (cattle on non-toxic fescue will not spend their summer under the shade or in the ponds!). To reduce risk of losing stands of non-toxic fescue from abusive grazing in the summer, a warm-season perennial, bermudagrass, can be planted. Bermudagrasses have been released with the cold tolerance to withstand Kentucky winters (Quickstand, Wrangler, Greenfield, and Tifton-44, to name a few). In this system, bermudagrass provides grazing from early June to early September. Bermudagrass persistence and productivity is closely linked with a good fertility program but can provide quality grazing in summer, particularly with adequate rainfall. Furthermore, it can be harvested to produce moderate quality hay. Another component that could be added is to drill rye, wheat, or a mixture of both into bermudagrass sod. The small grain grasses provide grazing in the late winter and early spring before the non-toxic fescue initiates active growth, which further reduces hay needs.

**Forage System: Kentucky-31 Tall Fescue, Novel Endophyte Tall Fescue, Bermudagrass, and Warm-Season Annual Grasses**

This system uses grasses that were present in the first forage system, but with the addition of a small acreage of warm-season annual grasses, such as
forage sorghum or sorghum-sudangrass hybrids. Management of the perennial grasses is the same as with the first system. Annual, warm-season grasses offer a higher nutritive value than bermudagrass and are generally more productive with dry weather. Therefore, it can provide grazing during dry weather patterns when it is desirable to conserve bermudagrass. Warm-season grasses should be grown adjacent to the bermudagrass to serve a primary purpose of providing high-quality creep grazing during the summer. Cows could also be periodically turned into the annual grass to control excessive growth and accumulation.

Forage System: Kentucky-31 Tall Fescue, Novel Endophyte Tall Fescue, and Alfalfa-Orchardgrass

In this system, an alfalfa-orchardgrass mixture replaces bermudagrass to provide high-quality summer grazing (dairy, breeders, pasture finishing, etc.). The mixture would need to be planted in well drained soils with inherent soil fertility. An advantage of this system is an ability to graze the toxic fescue through the early summer (this ability comes with good management!) to allow at least a single cutting of high-quality alfalfa-orchardgrass hay. Orchardgrass in the mixture can provide some grazing in the spring and fall, provided good grazing management is followed.

Stocking Rates and Grazing Management

Changing from a one or two forage system over the entire farm to a multitude of forages in different pastures will require an adjustment in cattle number. Reducing the acreage grazed within a season will substantially increase stocking density. However, it cannot be necessarily assumed that, for example, a reduction of 75% in grazeable acreage of forage will require a 75% reduction in herd size. Stocking rate decisions are typically based on expected forage growth during the most inactive pasture growth periods during the growing season (July and August for tall fescue). A forage system is designed to overcome periods of inactive growth (winter dormancy does not count since growth is nil) by moving cattle from one forage that is declining in growth to one that is actively growing. A reduction in herd size will be necessary reduce the chance of overgrazing, but this reduction in stocking should be compensated by improved consistency of cattle production with a greater growth distribution of quality forage, and a reduction in hay and feed costs.

Although overall stocking rates must be reduced, they must not be reduced to levels that are not profitable. Moderate stocking densities that are profitable can be sustained if grazing is managed using a rotational grazing system. Cost of establishing and managing forage systems justifies that rotational stocking be implemented to provide pasture regrowth and recovery for maintaining production goals.