Making Sense of the Forage Fescues

Adapted by Dennis Cosgrove, University of Wisconsin-River Falls

Fescues are one of the most popular and valuable grasses for use in managed grazing systems in north central and northeastern United States. Fescues can be separated in two broad categories: fine-leaf and broad leaf fescues. Fine-leaf fescues include sheep fescue, hard fescue, red fescue, Chewing's fescue and blue fescue, among others. These plants are valuable forages in their native habitats and are also one of the main pillars of the turfgrass industry. Broad-leaf fescues are a very small group of plants and include tall fescue and meadow fescue. Broad-leaf fescues do not look like, nor are they closely related to, fine fescues. Broad-leaf fescues are among the most important forage grasses in the United States. Advances in breeding have resulted in the introduction or reintroduction of several types of fescues described below.

Meadow fescue grass and seedheads.

Festulolium - a hybrid of ryegrass and fescue.

Tall fescue. When managed for hay or pasture, tall fescue is among the highest yielding perennial grasses grown in the Midwest. While it is the dominant cool-season grass in southeastern United States, it is not widely grown in the Midwest due to animal health concerns. Most fescues contain a naturally occurring fungus called an endophyte that lives in leaves, stem, seed, and crown tissue of infected plants. Endophytes and fescue plants benefit from a mutualistic relationship, each receiving a benefit from the other. Plants provide the fungus a home, water, and nutrients. Fungus produces two types of alkaloids that are released into the plant: lolines and ergovalines. Lolines protect the plant from drought, heat and predation by insects, and do not cause health problems in cattle. Ergovalines help protect the plant from predators but cause health disorders such as leg/foot ailments, loss of balance, and digestive problems which result in reduced rates of gain in cattle. The heat and drought tolerance provided by the endophytes are particularly important in southern climates, so health problems are tolerated. Farmers in Wisconsin and other northern states are able to grow other cool-season grasses such as smooth bromegrass and orchardgrass, so problematic tall fescue is not widely sown.

Endophyte-free tall fescue. Removal of the fungal endophyte is a solution to the disease issue. Endophyte-free varieties of tall fescue are created by exposing the seed to ambient temperatures (at least 75°F) for 12-18 months. Removal of these fungal endophytes avoids toxicosis issues but reduces drought and heat tolerance of these varieties. Removing endophytes appear to have no effect on persistence or yield of tall fescue in northern climates.

In a University of Wisconsin research project, beef steers gained ~22% more weight per acre on endophtye-free tall fescue compared to orchardgrass. Results indicate there should be no concern about pasture intake or milk production by dairy cattle on endophyte-free tall fescue and these varieties are now widely available. Producers considering tall fescue should always plant endophtye-free varieties in northern climates.

Novel-endophyte tall fescue. Recent research has identified strains of endophyte species found in tall fescue that are non-toxic (low in ergovalines) to livestock, but still provide benefits to the plant in stressful environments. In the southern U.S., planting tall fescue infected with novel endophytes is the surest way of eliminating animal losses from toxicosis while maintaining the benefits of the endophyte. In cooler, northern environments the benefits conferred by the endophytes are much less important. There appears to be no justification for adding these animal-friendly endophytes in Wisconsin and other northern environments particularly if it increases seed cost. Further, many of the varieties with novel endophytes have less winterhardiness than needed for Minnesota and Wisconsin, not because of the novel-endophyte, but simply because the novel endophyte was introduced to varieties inherently low in cold or freezing tolerance.

Soft-leaf tall fescue. Wisconsin research demonstrated cattle prefer other grasses over tall fescue when given a choice. Older tall fescue varieties have stiff leaves with barb-like projections on the edges, but new varieties with softer leaves are currently on the market. While no published data showed improved palatability of soft-leaf fescues, unpublished observations suggest some are more palatable. Winter survival becomes important when selecting soft-leaf varieties, as they show very different degrees of winter persistence. Currently several soft-leaf and stiff leaf tall fescue varieties survive northern winters extremely well. Producers are encouraged to visit with reputable seed company representatives and check variety trial information (www.uwex.edu/ces/forage).

Festulolium. Festuloliums are hybrid crosses of ryegrasses and fescues that possess some of the winter hardiness, heat tolerance and drought tolerance of fescue with the superior palatability and digestibility of ryegrass. Because most varieties were bred in regions of Europe where ryegrasses are generally well adapted, they do not survive under the harshest winter conditions. In the late 1980s, Wisconsin breeders developed the 'Spring Green' variety that could survive Wisconsin's harsh winters. This variety has been quite successful, even though its improvement resulted in only a small increase in winter survival. It is used primarily as a component of pasture seed mixes.

Meadow fescue. Meadow fescue was introduced to the U.S. in the 1800s. By the 1950s, meadow fescue was essentially forgotten due to consistently higher forage yields and superior disease resistance of tall fescue. Meadow fescue reappeared after the managed grazing movement of the 1980s gained momentum. Early on-farm research showed that, while tall fescue varieties provided more forage, the superior palatability of meadow fescue resulted in equal consumption of tall and meadow fescue. It is well suited to frequent, managed grazing, but not as well suited as taller grasses to hay management systems. Meadow fescue endophyte produces only protective alkaloids that contribute to heat and drought tolerance; because of this, meadow fescue shows none of the detrimental effects on livestock that can be caused by other fescues.

Adapted from "Forage Fescues in the Northern USA" by M. Casler, G. Brink, K. Albrecht, J. Lehmkuhler, and D. Combs. The publication is available on the UW Center for Integrated Agricultural Systems website (www.cias.wisc.edu).