

## The Fine Art of Grass Species Selection

*Laura Paine, Columbia County Crops and Soils Agent; and Michael Casler*

January, 2000

The 1948 Yearbook of Agriculture is titled simply "Grass". The book is a good read both as a window on history and a source of sound information, long forgotten by mainstream agriculture. In the introduction, P.V. Cardon optimistically states that "Recognition of the intrinsic value of grass itself of grass as a farm crop it pays to grow has elevated it to a plane that more and more people have come to appreciate." Back then, as today, grass had a problem getting respect.

Most graziers, though, understand the value of grass, we just want to know which ones to plant where. As we discussed last time, most people choose one or two species to work with, but there is value in considering complex pasture mixtures that include some of the less common species. Choose one or two that perform well in your area as the foundation of your pasture and add others to enhance the complexity of the mix. Legumes are a key component as well, adding diversity, fixing nitrogen from the atmosphere, and increasing forage quality. Complex mixtures are insurance against unpredictable changes in the environment, providing the tools that allow our pasture plant communities to adapt to whatever nature sends our way.

Grass species can be divided into two broad categories: warm season and cool season. Native North American grasslands were dominated by warm season grasses such as big bluestem and switchgrass. Native grasses can play a valuable role in pasture systems, but we have limited experience with them here in the Upper Midwest.

While warm season grasses produce primarily in July and August, cool season grasses provide 60% or more of their yield during May and June, slow their growth in July and August, and yield well again in the fall. These more easily handled cool season grasses are recommended for most rotational pasture systems, especially if you're just starting out. Below we have listed the main characters followed by some species that can play supporting roles:

Main characters:

**Kentucky Bluegrass (*Poa pratensis*).** Nobody intentionally plants Kentucky bluegrass, but it is common in Upper Midwestern pastures. In some ways, it is undervalued. While it is a relatively low yielding species that is prone to dormancy during hot, dry periods, it is a palatable, high quality grass that can take a lot of abuse. This sod forming grass fills in bare spots, especially if you overgraze.

**Orchardgrass (*Dactylis glomerata*).** Known as cocksfoot overseas, orchardgrass has been grown in North America since 1760. Because of its tolerance of light shade, it was a common groundcover for orchards and wooded pastures. It tends to mature quickly and is often ready to graze before other grasses in a mixed pasture sward. If not grazed early, it becomes stemmy and unpalatable. Many graziers find it easier to manage orchardgrass alone or with a legume. This is less of a problem if you specifically purchase seed of medium or late maturity varieties. If grazed often and low (3 to 4 inches), it is one of the best producers of high quality forage. Orchardgrass is somewhat susceptible to winterkill which, because it is a bunch grass, can result in a patchy pasture.

**Quackgrass (*Agropyron repens*).** Quackgrass is another uninvited guest in most pastures, but a welcome one.

A productive sod-former, quackgrass is persistent, winterhardy, and drought tolerant. All the features that contribute to its value in pastures make it an invasive weed in crop fields, so you can't buy quackgrass seed. We either have it in our pastures or we don't.

Reed Canarygrass (*Phalaris arundinacea*). Reed canarygrass is very slow to establish, but once established, is highly productive, persistent, and winterhardy. Usually recommended for wet conditions, it is equally well adapted to droughty soils. If you plant reed canarygrass, be sure to purchase alkaloid-free varieties. The 'wild-type' canarygrasses existing in marshes and wetlands contain anti-quality components that can reduce intake and potentially cause health problems in livestock. Try to avoid planting reed canarygrass near wetlands, where it is extremely invasive and has smothered out many of the native grasses and sedges that once made up marsh communities.

Ryegrasses, perennial (*Lolium perenne*) and annual or Italian (*Lolium multiflorum*). Ryegrass is a source of unending controversy among graziers. The mainstay of many New Zealand and European pastures, it has winter-hardiness problems in our climate of extremes here in the Midwest. Tetraploids and newer varieties have shown slightly better winter survival. If we can get it to persist, ryegrass is a valuable pasture choice. It is higher in quality than other cool season grasses because of higher digestible carbohydrate and lower fiber levels. Perennial varieties require high fertility and close, frequent grazing for peak performance, so, like orchardgrass, they are best managed in monoculture (although their lack of reliable winterhardiness argues against seeding alone). Italian ryegrass is a short lived perennial, more vigorous, but less hardy than perennial ryegrass. It can be frost seeded into existing stands to improve yield and quality. A couple of pounds of ryegrass is a good addition to all seeding mixtures because it germinates rapidly and can protect against soil erosion while the slower germinating grasses get established. Festuloliums are a hybrid between Italian ryegrass and meadow fescue and are thought to have the winterhardiness of the fescues and the high quality of the ryegrasses.

Smooth Bromegrass (*Bromus inermis*). Smooth brome is a hardy, productive, sod-forming species which is well-adapted to the southern part of Wisconsin. It is relatively tolerant of drought and heat but is not tolerant of close grazing. Unlike some other species which keep growing points near ground level, brome's elevated growing points often get grazed off, resulting in slower regrowth. Longer rest intervals or higher grazing is recommended. We don't usually recommend smooth bromegrass as a base for building productive rotationally grazed pastures in Wisconsin.

Tall Fescue (*Festuca arundinacea*). Tall fescue is vigorous, sod-forming grass, tolerant of heavy grazing and animal traffic. It is coarse and relatively unpalatable and in a mixed pasture, refusal can be a problem. Turf varieties and older pasture varieties contain an endophyte which can cause health problems in livestock. The endophyte is thought to impart disease and insect resistance to the plant which may improve winterhardiness. The new endophyte-free varieties appear to have good winter survival in Wisconsin, but are not significantly more palatable than the old varieties. We seldom recommend use of tall fescue for pastures in the Upper Midwest due to its palatability problems. However, it does stockpile well, retaining more nutritional value due to a waxy coating on the leaves. It is also a very tough grass that may be useful for high traffic and nutrient areas, such as feed lots, lanes, and drainage areas.

Timothy (*Phleum pratense*). Historically, the most important cool-season pasture and hay grass in North America, timothy has played a minor role in the recent resurgence of pasturing. It seems to be best adapted to the cooler, damper clay soils of northern Wisconsin. It is a bunch grass which grows from a small underground structure similar to a bulb. Unlike most other cool season grasses, timothy will continue heading out throughout the summer, even when kept grazed low. I have seen cattle select headed out timothy from within a pasture of less mature, seemingly more palatable plants.

Supporting Cast:

Creeping Foxtail (*Alopecurus arundinaceus*). This uncommon species, unrelated to the weedy annual foxtails, is adapted to wet meadow conditions. It heads out early in spring, but once harvested recovers quickly and yields well for the rest of the season. It responds well to grazing.

Meadow Brome (*Bromus riparius*). This long-lived perennial related to smooth brome is an early maturing bunch grass that does well in grass-legume mixtures. It is commonly used in pastures on the Canadian prairie, but current varieties are not well-adapted to the Upper Midwest states.

Meadow Fescue (*Festuca pratensis*). This is a close relative of tall fescue, but has less of a palatability problem, probably because it has softer leaves. It is shorter and has narrower leaves than tall fescue and is better adapted to wet soils. Meadow fescue was introduced to the USA before tall fescue, but fell out of favor when it was discovered that tall fescue had a higher yield. Some of our recent data indicate that this conclusion was premature. Meadow fescue is better adapted to grazing than to hay production.

Meadow Foxtail (*Alopecurus pratensis*). This species is adapted to moist, marshy conditions. Relatively unknown in the Midwest, it is thought to be tolerant of both summer heat and below zero temperatures. It is a palatable, but not exceptionally productive pasture component.

Redtop (*Agrostis alba*). Redtop is not a popular pasture grass, but it is included in some commercial pasture mixes. It thrives in low, wet soils under low pH conditions and tolerates grazing well. While not a major pasture species, it may fill a niche where the more common species are poorly adapted.

Now that we have the cast of characters, we can further refine roles through variety selection. For all species, look for later maturing varieties and avoid mixing species that vary widely in their need for rest cycles such as orchardgrass and smooth brome. For a complex pasture mix, you'd want to choose one or two primary species and add lesser amounts of several others, including, perhaps, some of the uncommon 'supporting cast' species. By including a broad range of grass species you'll be more likely to have a well-adapted plant community throughout your pasture system. We haven't talked about legumes, but of course they should be a prominent player in all pasture mixes. As we mentioned last time, broadleaf plants such as chicory can add more diversity.

If you're not comfortable mixing a lot of species together, you can try a complex mixture in a few paddocks to start with or in paddocks that have a lot of variability in slope and soil fertility. Another option would be to consider utilizing several simple mixtures in separate pastures to enhance the versatility of your pasture system. This is not a new concept. In the Proceedings of the Sixth International Grassland Congress (1952), R.E. Blaser and his colleagues presented a paper on "Advantages and Disadvantages of Simple and Complex Mixtures." They come down on the side of simple mixtures, but suggest an approach to capitalizing on the qualities of different species in a planting scheme involving four types of pasture.

The first pasture is seeded to orchardgrass and ladino clover, with red clover added to fill in the spaces till the ladino fills in. This mixture is mowed for hay or silage for the first cutting, then grazed for the rest of the season.

The second pasture is seeded to orchardgrass and alfalfa. This field should be ready to cut for hay after the first pasture. Subsequent harvests can be grazed or mowed as needed.

The third field is the main grazing pasture, to be grazed periodically throughout the season, but primarily in summer and fall. It should be the most broadly utilitarian mixture you've got. Being from the south, the authors recommend seeding it to tall fescue and ladino with red clover added to fill in the gaps till the ladino gets going. In our area, one would probably want to seed a mixture of smooth brome, timothy and reed canarygrass, with ladino and red clover.

The fourth field is seeded to bluegrass and white clover and can be grazed periodically throughout the season. Because of its tolerance of close grazing and treading, it is used primarily as an overwintering pasture or a holding area during wet weather.

This combination of pasture personalities or one of your own devising, can help even out the highs and lows in pasture productivity that occur when one depends on just one or two species. The authors don't recommend proportions of a pasture system for each of the types, and I think this would have to be determined by the needs of your operation: how much winter feed you need to harvest, the amount of land needed for overwintering and wet weather, the quality of forage you need to feed, and other factors.

Whichever way you choose, to go complex or simple, do some background research first. A couple of UW Extension bulletins can help you get started. These are the annual Forage Variety Update (A1525), Pastures for Profit (A3529) and Identifying Pasture Grasses (A3637), all available from your County Extension office for a small charge.