

Four More Unconventional Grasses to Know and Love

By Doug Brede, Ph.D.

The first installment of "Grasses to Know and Love" appeared in the August 2000 TurfGrass Trends. This second edition describes four more unconventional grasses, and how and where you can use them in your landscapes.

There's an old African proverb that says, "When elephants fight, it's the grass that suffers." Now you might think I brought up that quote to talk about wear tolerance or something similar. I didn't. I brought it up to discuss the classification of grass species.

Right now there is a great deal of wrangling going on among botanists and taxonomists ("the elephants") about how grasses are grouped. Species lines that were once crystal clear, are becoming increasingly blurred. All this squabbling adds to the confusion among consumers.

In this installment of "Grasses to Know and Love," I'm going to show you how four (or possibly five or six, depending on which expert you talk to) unconventional grasses



Sheep fescue, when combined with other fine fescues, provides a low maintenance, shade-hardy mixture for golf courses and other turf surfaces. In this photo, a Scottish Links brand mixture forms an attractive cascading appearance on a hill slope, requiring little upkeep.

can be used in your landscape. And I'll help steer you through the current maze of species changes, without getting trampled.

Most sheep are no longer sheep
Sheep fescue is a vastly underappreciated grass, considering its potential. Sheep fescue

TABLE 1: CHARACTERISTICS OF SHEEP FESCUE

- Dusty blue (glaucous) appearance
- Fine leaf texture with stiff, curving blades
- Tufted growth habit (a bunch grass) with some minor creeping ability
- Very tolerant of low pH and drought
- Fairly rapid seed germination
- Slender seedheads form in June, turning red at maturity, and later tan
- When left unmowed, it will produce viable seeds that scatter and fill in bare spots
- More heat tolerant than other fine fescues (6)
- Most varieties do not contain an endophyte

has the best drought tolerance and water-use rate of all the cool-season turfgrasses. Recent studies have grouped sheep fescue even among the best prairie and dryland grasses in terms of water consumption. It ranks neck-and-neck with the top warm-season species – long renown for their drought proclivities.

A drought study at Colorado State University (5) put sheep fescue in a class by itself among fine fescues (see page 8 table).

Granted, sheep fescue does not have the smooth texture and high density of some of the premium turfgrasses. In his classic textbook (3), Jim Beard states that sheep fescue, “forms a relatively low quality turf. It seldom forms a uniform shoot density and

appearance.” However, modern cultivars are making strides in appearance, while retaining sheep fescue’s tenacious drought-defying rooting.

In the 1993 National Turfgrass Evaluation Program (NTEP) trial, two sheep fescues, ‘MX-86’ and ‘Bighorn,’ were among the top entries, trouncing many popular chewings and strong creeping red fescue varieties (www.ntep.org/comm/ff93_98-13.htm). Heat and drought tolerance enables sheep fescue to prosper under harsh summers.

However, if you put sheep fescue under a cool, drizzly, coastal climate, it will become noncompetitive and relatively unattractive. It looks far better in Wichita,

TABLE 2: GRASSES MENTIONED IN THIS ARTICLE

Common name	Latin name	US distribution	Worldwide distribution	Most resembles	Cultivars	Seeding rate lbs/1000 ft ²
Highland bentgrass	Agrostis castellana Boiss. & Reut.	Naturalized throughout US and Australia, New Zealand, South America	Native to Africa, Portugal, Azores, Albania, Bulgaria, France, Greece, Italy, Portugal, Spain, Yugoslavia	Colonial bentgrass	Highland, BR 1518	1 to 3
Idaho bentgrass	Agrostis idahoensis Nash	Native to British Columbia, AK, AZ, CA, CO, ID, NM, MA, NV, OR, UT, WA, WY	Naturalized in South America	Colonial bentgrass	GolfStar	1 to 3
Sheep fescue	Festuca ovina L.	Naturalized throughout US and much of the temperate world	Native to Armenia, Azerbaijan, China, Georgia, Japan, Korea, Mongolia, Russian Federation, Turkey, most of Europe, Sweden, Ukraine, United Kingdom	Hard fescue	Quatro is the only “true” sheep fescue; MX-86, Azay, Mecklenburger common, Bighorn, Azure, Norfarm 67135 are to be now considered bluish hard fescues	4 to 6
Blue fescue	Festuca glauca Vill.		France	Sheep fescue	SR 3200, PST-4MB (a blue x hard fescue hybrid)	4 to 6

KS, than where Beard observed it in Michigan.

One particular application of sheep fescue is for unmowed, vista turf. Sheep fescue has a striking blue color and short stature when unmowed. Its blades rarely exceed 10 inches with seedheads reaching 18 to 24 inches in June. A once-yearly trim mowing eliminates the seedheads and keeps sheep fescue looking tame. I have two acres of MX-86 sheep fescue in my back yard that provides an soft, meadow-like appearance with no mowing required. Golf courses have successfully used sheep fescue on unirrigated rough areas. On slopes, it forms a eye-catching waterfall appearance (see photo on page 8).

And now the controversy. For the last 100 years or so, sheep fescue was *Festuca ovina* and hard fescue as a botanical variety of it, *F. ovina* var. *duriuscula*. And all was well with the world.

Then in 1954 C.E. Hubbard (8) recast hard fescue as *F. longifolia*, only to have it renamed *F. trachyphylla* in 1980 by I. Markgraf-Dannenberg (10). More recently, *F. trachyphylla* was splintered into two separate species, *F. brevipila* and *F. lenensis*, and *F. longifolia* was subdivided into the normal *F. longifolia* and *F. glauca*, or blue fescue (9).



Dryland bentgrasses are more common than you might think. The swirling patches in this old cemetery near Pittsburgh, PA, are all dryland bents. Under unirrigated conditions like this, dryland bent can out-compete many other turfgrasses, including bluegrass and fescue.

You've no doubt seen plants of *F. glauca*. The vegetative variety 'Elija Blue' is used in all-too-many ornamental beds.

Two years ago, Penn State's David Huff decided to make sense of all this splintering by surveying the chromosomes of fine fescue. His idea was to let the chromosomes guide him in grouping these grasses – especially considering that many of these fescues exhibit a nearly identical fine-bladed mor-

TABLE 3: FINE FESCUE CHROMOSOME COUNTS

56 chromosomes

- Strong creeping red fescue (*F. rubra* L. spp. *rubra*) {'Cindy,' 'Herald,' 'Flyer'}

42 chromosomes

- Hard fescue (*F. brevipila* Tracey) {'Biljart,' Scaldis, 'SR3100' – this category also includes the bluish hard fescues [formerly sheep fescues] of Bighorn, MX-86, Azure, 'Azay'}
- Chewings fescue (*F. rubra* spp. *fallax* [Thuill.] Nyman) {'Banner,' 'Brittany,' 'Jamestown II'}
- Slender creeping red fescue (*F. rubra* L. spp. *litoralis* Vasey) {'Dawson,' 'Marker,' 'Seabreeze'}

28 chromosomes

- Sheep fescue (*F. ovina* L.) {Quatro}

14 chromosomes

- Hair fescue (*F. filiformis* Pourret) {'Barok'}
- False sheep fescue (*F. pseudovina* Hackel ex Wiesb) {'Covar'}

phology. But as with any good research study, Huff's analysis raised as many questions as it answered.

Huff's paper (9) points to paradox in sheep and hard fescue: "In the USA, sheep fescue is described as having a bluish-gray leaf color whereas hard fescue leaf blades are considered to be green. In Europe, just the opposite is the case. Sheep fescue has a greenish leaf color whereas hard fescues often exhibits a bluish-gray color."

He turned to an elaborate laboratory device for answers. Laser flow cytometry is used normally to screen cells for cancer, by detecting minute weight differences in the cell's DNA. Cells with fractured chromosomes exhibit a varied DNA weight. Huff adapted this technique for turfgrasses and used it to group fine fescues.

From his analysis, Huff found only one variety in the USA that is a true sheep fescue: the variety 'Quatro.' Other sheep fescues (Bighorn, MX-86, 'Mecklenburger common,' and 'Azure') were reclassified as hard fescues. Huff did find a minor DNA difference between these bluish varieties and the traditional hard fescues, 'Spartan' and 'Scaldis' – but not enough of a difference to justify a new species.

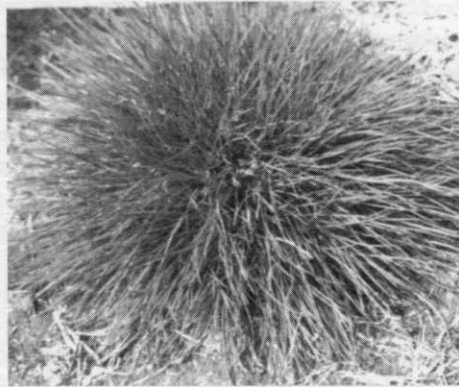
Huff grouped the fescues based on chromosome number (shown with typical cultivars in brackets) on page 10.

In spite of all these confusing reshuffles, sheep fescue and the newly recognized bluish hard fescues remain an excellent choice for the low maintenance landscape.

Dryland bentgrass – an oxymoron?

It seems inconceivable to most people who grow creeping bentgrass that a thing like "dryland bent" could actually exist. Creeping bentgrass, and its close relative colonial bent, are definitely moisture-loving grasses. One botanist even terms them marsh grasses. That explains why we have to pump so much water just to keep them alive.

The dryland bentgrasses evolved under droughty conditions. One of the best known members of the dryland bentgrasses is 'Highland' bent (*Agrostis castellana*). Highland bent evolved in the Southern



*A 1-year-old spaced plant of Idaho bentgrass (*A. idahoensis*) (about 40 cm across) showing its bunch-type growth habit. In its second year of growth, lateral tillers can be observed pegging down at nodes, similar to perennial ryegrass. This photo was taken in mid June before flowering. Inflorescences begin appearing in mid July, and the species is in full color maturity around August 1st. Idaho bentgrass is one of several bentgrass species native to America. Most bentgrasses (creeping, velvet, colonial) originate from Europe. Some native American bents have stolons or rhizomes, but others like this one are true bunch grasses, showing little or no lateral creeping ability.*

Mediterranean, where warm, dry summers are the norm. Interesting enough, the name 'Highland' is the name for both the species and its most famous variety.

The Highland variety is a collection of strains from the hills of Western Oregon. But it is not native to Oregon. Highland bentgrass was originally imported from Europe in the 1930's and was planted throughout the area west of the Cascades until the 1970's.

Species	Drought tolerance	Type of drought it can survive
Sheep fescue	Excellent	Frequent, severe
Hard fescue	Good	Occasional, long term
Chewings fescue	Medium	Frequent, moderate
Strong creeping red fescue	Medium	Frequent, moderate
Slender creeping fescue	Poor	Infrequent, short duration

SOURCE: COLORADO STATE UNIVERSITY STUDY

C.E. Hubbard (8) was one of the first to recognize Highland as a distinct species from colonial. Most scientists have since accepted this classification, including one writer from Oregon State University (www.orst.edu/Dept/hort/turf/common.htm): "I agree with [Hubbard] from a practical field standpoint because Highland bentgrass has distinct morphological and growth characteristics that set it apart from colonial bentgrasses. For example Highland is strongly rhizomatous and requires low mowing heights to avoid severe false crowning. Highland bentgrass forms a dense turf that looks best when mowed at 0.5 to 0.75 inch. Highland has a dark blue gray color and generally looks better in winter than

other bentgrasses. It also looks good in early spring but loses color and becomes stemmy during May through mid-June."

Years ago, the production of Highland bentgrass was such a staple to the Oregon economy, that the Highland Bentgrass Commission was established in the late 1950's to promote seed in domestic and foreign markets (www.css.orst.edu/seed-ext/commissions/bentgrass.htm). Highland bentgrass was sold for golf course fairways and even putting greens. I personally spent two years of my life trying to manage 27 fairways of a Highland/'Astoria' blend in a Pennsylvania river valley. (We later gave up and converted to 'Penncross').

J.L. Eggens and his colleagues (7) at the

TABLE 4: CHARACTERISTICS OF IDAHO BENTGRASS

- Identifying features of the plant – A tufted, perennial bunch grass. Appearance in turf is most similar to colonial bent, although blades are somewhat broader and darker (see photo). Unmowed, the plants mature about knee high with a brilliant purple-red seed-head color at maturity.
- Identifying features of the seed – Seed characteristically lacks a palea, appearing to have a "naked belly." About 1/3 of the seed loses its lemma in threshing and appears as naked caryopses.
- Moisture requirements – In its native habitat, Idaho bentgrass survives on as little as 15 inches of annual precipitation. It is found most abundantly along streambanks, indicating that it favors moister conditions.
- Turf uses – Idaho bentgrass is ideally suited to lawns, where a softer, fine textured grass is desired. Also to: Low maintenance sites; alkaline, mildly saline, or heavy metal-impacted sites; golf fairways in blends with fine fescue; winter overseeding of greens as an alternative to *Poa trivialis*, where the superintendent desires the "look of bentgrass;" or as an ornamental grass when planted in mass and left unmowed.
- Mowing tolerance – Plants of Idaho bentgrass directly from the wilds become coarse and thinned when mowed below 3 inches. With breeding, however, Idaho bent has shown mowing tolerance to as close as $\frac{1}{2}$ inch. Its ideal performance is at traditional lawn heights of 1 to 2 inches. GolfStar has tolerated 5/32-inch (4 mm) cut when used for winter overseeding of dormant bermuda greens.
- Thatch – Low thatching; considerably less than velvet or creeping bentgrass but more than perennial ryegrass.
- Sod 'cutability' – Similar to Kentucky bluegrass, according to one Maryland turf farm. Nylon netting is not required for a sod crop.
- Disease reaction – Idaho bent is remarkably resistant to a number of North American turf diseases (see Fig. 2), particularly at mid-range cutting heights (1 to 2 inches). At closer cuts, it becomes increasingly susceptible.
- Seed establishment – Seeding rate is similar to other bentgrasses, in the range of 1 to 2 lbs. per 1000 ft². For winter overseeding, rates up to 3 lbs. are desirable. Seedling vigor is better than most bentgrasses, and just shy of the rapid establishment rate of redtop.
- Major advantages – Because of its bunch growth habit, this species can be maintained as a lawn, without the problems of puffiness, scalping, false crowns, and excessive thatch associated with other bentgrasses. For the uninitiated viewer, a lawn of Idaho bentgrass looks like creeping bentgrass. Idaho bent can be mixed with perennial ryegrass or fine fescue.
- Shortcomings – Pale mid-winter color in the North (this mid-winter dormancy is probably a function of its cold hardiness). The current cultivar, Golfstar, becomes thinned if mowed below 5/8 inch.

University of Guelph (Ontario, Canada) surveyed the performance of four bentgrass species for fairways and greens. They found (as expected) that creeping bent was the most suitable in terms of quality, color, and resistance to *Poa annua*. Dryland bent performed a lot like colonial bent, except with a darker color and lesser resistance to *Poa*. Browntop bentgrass (*A. capillaris*) showed characteristics intermediate between the two. 'Egmont' is a browntop bent.

Dryland bent has two unique services on a golf course:

1. In the froghair area or intermediate rough, where mowing heights are below one inch – generally that's too tall for creeping bent to prosper.

2. On dry mounds and rough areas receiving little or no irrigation or mowing.

Look at Idaho bentgrass

This is a native American bent. Idaho bentgrass is a novel species of bent, released only recently onto the seed market. It is similar in many of its characteristics to the dryland bentgrasses, but has several unique characters and adaptations.

I wish I could say the discovery of the turf potential of Idaho bentgrass was the result of the exhaustive study of hundreds of potential native grasses. It wasn't. Oftentimes in research, serendipity is one of our finest tools.

I first discovered the potential of Idaho bent in 1987 when one of our fieldmen brought in a sample of what he thought was dwarf redbtop (*A. gigantea*). The plant was growing in a field of 'Streaker' redbtop, along a river

drainage so polluted with heavy metals, that it's within one of EPA's Superfund sites. Upon examination of the field, I found a number of these dwarf plants, which later keyed out to *A. idahoensis*. Subsequent collection trips to that river basin (by fishing boat) netted several hundred promising specimens.

The initial turf quality of these introductions was poor, averaging 2 to 3 on a 1 to 9 quality scale, with 9 equal to ideal turf – similar to redbtop. However, the species responded favorably to breeding, increasing in quality with each generation. In 1999, we produced our first crop of 'Golfstar' Idaho bentgrass (4). You can see several characteristics of this turfgrass on the previous page.

— Doug Brede is a scientist, plant breeder, and writer based in Post Falls, Idaho. His breeding efforts have led to the identification of a new species with turf potential – Idaho bentgrass – for which he holds the US patent (5,981,853). His breeding staff is responsible for developing over 50 of today's most popular turf cultivars. Brede earned a Ph.D. degree at Penn State University and worked as Associate Professor at Oklahoma State University before taking the research director's job at Jacklin Seed/Simplot Turf & Horticulture, where he works today.

Brede describes Idaho bentgrass and 400 additional unconventional grasses in a new book dealing with useful ways for lowering your turf maintenance – making turf care easier rather than more complicated. The book, entitled "Turfgrass Maintenance Reduction Handbook – Sports, Lawns and Golf," can be found at the publisher's web site (<http://www.sleepingbearpress.com/catalog.asp?category=turf> or phone 734 475-8787) or at many turf trade shows.

REFERENCES

1. Anonymous. 1981. Native grasses no better or worse than introduced. Idaho Farmer-Stockman. May 7, p. 16.
2. Asay, K.H. and K.B. Jensen. 1996. Wheatgrasses. ch. 22. In Cool-season forage grasses, ASA monograph no. 34, Madison, WI.
3. Beard, J.B. Turfgrass science and culture. Prentice-Hall, Englewood Cliffs, NJ.
4. Brede, A.D. 1999. Idaho bentgrass: A new species for turf. Agron. Abstr. p. 134.
5. Butler, J.D. and J.D. Fry. 1987. Growing turf with less. Rutgers Turfgrass Proc., NJ AES, pages 1-4.
6. Dernoeden, P.H., M.J. Carroll, and J.M. Krouse. 1994. Mowing of three fescue species for low-maintenance turf sites. Crop Sci. 34:1645-1649.
7. Eggens, J.L., K. Carrey, and N. McCollum. 1993. Evaluation of bentgrass cultivars managed as fairway and putting green turf. Guelph Turfgrass Inst. pages 77-80.
8. Hubbard, C.E. 1984. Grasses. Penguin Books, Middlesex, England.
9. Huff, D.R. and A.J. Palazzo. 1998. Fine fescue species determination by laser flow cytometry. Crop Sci. 38:445-450.
10. Markgraf-Dannenberg, I. 1980. Festuca. pages 125-153. In T.G. Tutin (ed.) Flora Europea, Cambridge Univ. Press, Cambridge, UK.