

Colonial and Highland bentgrass *(Agrostis sp.)*

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Introduction:

In areas west of the Cascade Mountains from Vancouver, BC as far south as Grants Pass, OR and along the coast clear down to the San Francisco, CA area, bentgrasses are arguably the most important grasses used for turf. Ironically, they have rarely been knowingly planted since approximately the mid-1970's. Today, bentgrasses most often come into lawns as contaminants in soil and in some cases in seed or sod mixtures. Despised by the seed trade and many people involved in commercial landscape maintenance, bentgrasses are uniquely suited to the mild climate and consistently out compete even the most elite cultivars of perennial ryegrass, fine fescues, Tall fescue, and Kentucky bluegrass. Like it or not bentgrass is here to stay!

Taxonomy and history:

The taxonomy of bentgrasses is complicated and confusing because it involves numerous species and interspecies hybrids that are very similar in appearance. To make matters worse, early plantings dating back to frontier days were composed of mixtures of species brought to America from Europe. Today in any stand of bentgrass you are likely to find three or four different species.

In A.S. Hitchcocks "Manual of the Grasses of the United States" (1971) first published in 1935, he describes Colonial bentgrass as *Agrostis tenuis* Sibth. In his own words, "This species appears not to be native in America; it has been referred to *A. capillaris* L., a distinct species in Europe." The wording in this description is odd and it is not clear if he means that *Agrostis tenuis* is in fact *Agrostis capillaris* or is a distinct species that is related to *Agrostis capillaris*. Historically in the United States we have called Colonial bentgrass *Agrostis tenuis* but C.E. Hubbard in "Grasses" (1984) considers *A. tenuis* and *A. capillaris* as synonyms. Turgeon in the sixth edition of "Turfgrass Management" (2002) opted to classify colonial bentgrass as *Agrostis capillaris* L.

Even more confusing is the host of common names associated with this grass. In addition to Colonial bentgrass it has been called Rhode Island bentgrass, Rhode Island Colonial, New Zealand bentgrass, Prince Edward Island bentgrass, Common bent, and Browntop bent. It was also a component of the South German mixed bentgrass, which was commonly planted in the early days.

It is probably safe to assume that Colonial bentgrass arrived in the Northwest with the explorers and settlers. The first mention of Colonial bentgrass as a seed crop dates back to 1926 when "Astoria" bentgrass was collected by Engbretson and Hyslop in Northwest Oregon (Alderson,1995). By 1930, Astoria was planted in Klamath county Oregon, followed later by plantings in the Willamette Valley. For many years Astoria Colonial bentgrass was the bentgrass of choice for lawns throughout the region.

In 1926 Highland bentgrass was recognized as a distinct type growing in the Umpqua Valley near Yoncalla, OR. by George Hyslop a professor at Oregon State College and Harry Schoth a USDA employee stationed in Corvallis, OR (Schoth). In 1930 a naturalized stand of Highland was found near Hubbard, OR in the Willamette Valley. The first certified seed of Highland bentgrass was produced in 1934 by A. R. Colman of Hubbard.

Highland bentgrass has commonly been considered an aberrant form of *Agrostis tenuis* Sibth. Vaartnou (1967) noted that the Highland type he worked with in his research was more closely related to redtop *A. gigantea* than to Colonial bentgrass. Because of the differences between Highland bentgrass and true Colonial types, Highland was reclassified as Dryland bentgrass, *Agrostis castellana* Bois. & Reuter by H. Scholz (1966) based on his study of herbarium samples in Germany. Madison (1971) agreed that Highland differs significantly from Colonial bentgrass but argued that it was probably not worthy of its own species designation. I suspect further taxonomic work is needed to properly place Highland bentgrass.

From a practical standpoint I tend to refer to bentgrasses I find in lawns as either "Highland types" or "Colonial types" based on their color, general growth habit, morphological characteristics, and degree of rhizome production.

Performance in the Pacific Northwest:

Up to about the mid to late 1960's "Astoria" Colonial bentgrass and Highland bentgrass were commonly found in seed mixtures sold in areas west of the Cascades. Because bentgrass readily colonizes waste areas and seeds prolifically under unmowed conditions it has naturalized throughout this region and is a significant component of the soil seed bank. At present it is rarely planted on purpose but is essentially ubiquitous throughout the region. In mature landscapes it is the dominant grass found in old lawns. My observations indicate that Highland types are most common, followed by creeping bentgrass, and then Colonial bentgrass.

Bentgrasses are also found east of the Cascades but generally only as contaminants in seed mixtures. East of the Cascades bentgrasses do not appear to be part of the soil seed bank. I have observed Colonial and Highland types in North Central Washington and in Central Oregon. In the same areas I have also found creeping bentgrass generally in very old lawns where it may have been included in the original seed mixture.

Mowing:

Colonial bentgrass is best mowed fairly short and at least once per week. It will provide a quality surface at mowing heights between .38" and 1". Some of the newer cultivars even look good as high as 1.5". At 2" and above turf quality declines and false crowns and scalping occur from late summer on. Highland bentgrass looks best mowed once to twice per week between .75" and 1.0". Above 1.0" it is prone to false crowning and scalping. Lawns under low nitrogen fertility can generally tolerate slightly higher mowing heights without false crowning than lawns that are regularly fertilized. False crowning also seems to be worse when lawns are heavily irrigated.

Since bentgrasses invade and tend to dominate lawns planted with more erect growing grasses like perennial ryegrass, turf managers are regularly faced with a dilemma. If you mow high for the planted grasses you end up with ugly scalped false crowns on the invading bentgrasses. If you mow low enough to get best performance of the bentgrass you really need to mow with reel mowers since rotary mowers aren't suited to such low heights. Since rotary mowers dominate commercial maintenance, we are destined to ugly lawns in late summer because of the false crowning. This wasn't a problem years ago when most people purposely mowed with reel mowers. This is one of the reasons I have observed that general quality of older lawns west of the Cascades has actually declined since the late-1960's when we switched from bentgrass to ryegrass and bluegrass and from reel to rotary lawnmowers.

The best general advice I can offer is to mow lower rather than higher when dealing with bentgrass. Reel mowers should be the mower of choice on bentgrass lawns. You can use rotaries somewhat effectively if you start the season by scalping the lawn low and then keeping the mower as low as possible through the season. Once false crowning begins in late summer raise the height one setting at a time up to a maximum of 2-2.5". Sometimes you can get through the season without scalping but you will always have to start over each spring by scalping or dethatching prior to scalping.

Thatch:

Bentgrass has a reputation for producing lots of thatch. In my opinion this is due partly to the fact that bentgrass is very persistent so it is easy to find bentgrass lawns that are old and have had a chance to accumulate thatch. It is exaggerated by mowing too high which results in development of false crowns and the understory debris commonly observed in bentgrass. Compared to other grasses, bentgrass thatch is fairly light and almost fluffy. It tends to be mostly elongated stems and roots.

The best way to manage bentgrass thatch is via annual or every other year mechanical dethatching with a solid blade dethatcher. Low cut turf withstands dethatching better than turf that is mowed too high. Spring is definitely the best time for dethatching bentgrass and will result in rapid recovery if dethatching is followed by nitrogen fertilization. Fall dethatching works but often results in an increase in the amount of *Poa trivialis* and *Poa annua* in the stand since they grow better in winter than bentgrass.

Old bentgrass lawns with deep thatch can be destroyed by mechanical dethatching because most of the roots are in the thatch. In this situation light dethatching followed by coring is the best way to deal with the thatch. While it doesn't remove much thatch, it does improve water infiltration and improves rooting in the soil.

Fertility:

Colonial and Highland bentgrass have very low nitrogen fertility requirements. Their ability to grow well under low fertility conditions is one reason they are so competitive with planted grasses. Mature lawns with clippings returned can often get by with as little as 1 lb N/1000 per year. When clippings are removed, 2 or 3 lb N/1000 is generally adequate to provide high quality turf. It just doesn't need much nitrogen.

Irrigation:

The water use rate of bentgrass is typical of most other cool season grasses. Unfortunately, it has a relatively shallow root system and it performs best when irrigated regularly. It doesn't need more water than other grasses it just needs water more frequently in order to produce attractive turf. Turf irrigated once per week will look okay, twice per week will look good, and three times per week will generally look great.

Despite the need for regular irrigation to look dense and green, bentgrass tolerates prolonged drought well by going dormant. Highland types are extremely tough because they can recover from crowns and rhizomes. From Corvallis to Seattle area I have observed remarkable recovery of old bentgrass lawns even after an entire summer without water.

Diseases:

Colonial and Highland bentgrasses are susceptible to a modest number of diseases. Fusarium patch is probably the most important winter disease and in most years will cause damage on lawns and golf course turf. Fusarium can be exacerbated by the prolonged dew retention common to bentgrass. Red thread can also cause slight damage but in general, bentgrass is less affected by Red thread than perennial ryegrass. Young stands of bentgrass are often injured by Take-all patch, but the severity decreases as turf ages. Red leaf spot disease can cause damage to Colonial bentgrass generally from spring into early summer. In old lawns, Fusarium patch is generally the only significant disease.

Both Fusarium patch and Take-all patch can be partially controlled by increasing sulfur fertilization to 3-4 lbs S/1000 per year. Red thread can be reduced significantly with adequate nitrogen fertilization during the times when Red thread is active.

Insects:

European Cranefly is the only significant insect that damages bentgrass in most years. Grass type doesn't seem to make much difference with this insect but I have seen significant injury on many predominantly bentgrass lawns. In many cases damage amounts to nothing more than a good dethatching and lawns recover fine without treatment. Under droughty conditions we have experienced periodic Chinch bug outbreaks but never on a regular basis. Black cutworms are often present in bentgrass lawns but I have never observed damage in lawn settings. On golf course putting greens Black cutworms may require control efforts to avoid injury.

Heat and Cold Tolerance:

Both Colonial bentgrass and Highland bentgrass are classic cool season grasses. They are at their best in spring, fall, and during mild winters. Highland maintains excellent winter color in most years. Colonial bentgrass often goes partially dormant in winter turning slightly brown to orange brown. Both grasses can tolerate the coldest winters in the Northwest without damage.

Neither grass looks its best in the heat of summer, but with adequate irrigation and proper mowing both bentgrasses produce high quality turf. In more severe climates these bentgrasses tend to struggle in the heat and often fall prey to diseases or summer insects. All things considered Colonial and Highland bentgrass will tolerate the highest temperatures found in western parts of the Pacific Northwest.

Shade:

Both of these grasses perform well in shade. When I examine old shady lawns I generally find that bentgrass, annual bluegrass and roughstalk bluegrass are the dominant grasses. In partially shaded lawns receiving morning sun and afternoon shade these bentgrasses thrive and probably produce their best year around turf. They also do well in sites with partial shade all day long. In heavy shade bentgrass will be one of the only surviving grasses. Fusarium patch disease will be more of a problem in constantly shaded bentgrass.

To maximize performance of these bentgrasses I try to place them so they get morning sun and afternoon shade. The temperature moderation provided by the shade makes it easier to properly irrigate during summer, which maximizes turf quality.

Wear:

It is real simple. Neither Colonial nor Highland tolerate wear. They will be among the first grasses to disappear on heavy wear sites. They will tolerate average foot traffic just fine. If my memory is correct, Colonial bentgrass was actually planted in Joe Albi stadium in Spokane and was virtually destroyed after one game.

Persistence and overall performance:

Bentgrass is the most persistent grass we grow west of the Cascade Mountains. It will grow on the most nutrient deficient sites, survives prolonged drought stress, grows on wet sites and in shade. It will invade and dominate all other planted grasses because it grows so well during the fall through spring period. Its small seed size facilitates dispersion and it is a long-lived component of the soil seed bank. Without chemical intervention (and even with it) old lawns will generally contain significant amounts of bentgrass.

Colonial and Highland bentgrasses are average in most categories. They will never appear at the top of any variety trial ratings. They don't look good when mowed high and they require regular irrigation to look nice in summer. They produce a fair amount of thatch, have poor wear tolerance and are susceptible to several common diseases. Their strong suit is persistence and good performance in cool parts of the year. They are not well suited to standard commercial maintenance practices, but with intelligent care they can produce beautiful turf.

The future:

Of all the domesticated grasses, Colonial and Highland bentgrass have received the least amount of attention from breeders. Because of their ability to persist under low input conditions it seems like they would be the object of intense selection and breeding work. One of the goals of a breeding program should be to redesign the canopy architecture towards more upright growers better suited to higher mowing without developing false crowns. Selection for strong rhizome development would also be desirable. When it comes to improving these bentgrasses it is almost a clean slate. Perhaps one day breeders will seriously tackle this challenge. Whether they do or not, bentgrass will be with us in areas west of the Cascades as a dominant grass for as long as we maintain turf.

Available Cultivars of Colonial Bentgrass:

Alister
Bardot
Exeter*
Glory
SR 7100
Tiger
Tiger II

Available Cultivars of Dryland Bentgrass:

Exeter*
Highland

* It isn't clear whether this is a true Colonial or a Highland type. Growth habit and general performance is more like Highland than Colonial, but it has traditionally been considered a Colonial.

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