

Identifying Turf-Grass Seed

By F. H. Hillman

Seed Laboratory, United States Department of Agriculture

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The greenkeeper's experience in handling the seed of turf grasses leads him to become acquainted with the identification characteristics of some of the kinds most commonly used. Differences in size, shape, and color indicate differences in kind. Unusual proportions of chaff and weed seeds can not easily escape notice. Thus seed of Kentucky bluegrass, redtop, fescue, crested dog's-tail, sweet vernal grass, and Bermuda grass are readily distinguished one from another. The chaffy German bent seed is conspicuously different from the well cleaned seed from the Pacific coast and from Canada. Some imported bent seed is easily distinguished from domestic seed by its numerous accompanying weed seeds. These kinds of seed and the physical condition of the sample can be recognized with the unaided eye, a magnifying glass not being necessary.

Some of the kinds of seed referred to are representatives of groups of closely related kinds which are also of interest to the greenkeeper. Close relationship of plants usually is accompanied by close similarity of their seeds; this is conspicuously true of the turf seeds under discussion. Kentucky bluegrass (*Poa pratensis*) is one of at least five kinds of *Poa* of more or less interest to greenkeepers in one section or another of the country. The word "bluegrass" appears in the common names of four of them, and the words "meadow grass" appear in the names of two; thus the common names do not suggest the close relationship of all of them. Excepting Kentucky bluegrass of domestic production, the remaining kinds, which are imported, are Canada bluegrass (*Poa compressa*), rough-stalked bluegrass or meadow grass (*Poa trivialis*), wood meadow grass (*Poa nemoralis*), and annual bluegrass (*Poa annua*). Seed of Canada bluegrass, which may be of turf interest in some sections, has been used as an adulterant of Kentucky bluegrass and would be an undesirable substitute for the latter in many sections of the country. The two meadow grasses and annual bluegrass have their place in the turf problem, and when these grasses are specifically desired their seeds should not be confounded. How can the greenkeeper, provided with nothing better than a hand-magnifier and probably unfamiliar with the points of distinction and identification of the kinds, distinguish between them? The expert seed analyst, knowing the fine points of distinction, requires the best of hand-magnifiers, and sometimes a compound microscope, to insure accurate identification.

The turf fescues represent several kinds according to the names under which they appear in the trade. Red fescue (properly *Festuca rubra*) is a popular name. Much seed labeled thus comes from Europe. Chewings' fescue (*Festuca rubra fallax*), a variety of red fescue, comes from New Zealand. Often the preference is for the New Zealand variety. How is the greenkeeper to distinguish them if he is not provided with the means and the knowledge with which to use it? The slender seeds of the so-called red fescue from Europe have a brownish color when a small quantity is examined spread out. A hand-magnifier shows that some of the seeds are very finely hairy,

and it is to be observed that many of the tapering seeds terminate in a slender bristle, or awn. Chewings' fescue seed is usually lighter colored and has a slight purplish tinge. They are all smooth and only an occasional seed terminates in a very short awn. Turf fescue seed from Europe is imported as red fescue (*Festuca rubra*), sheep's fescue (*Festuca ovina*), hard fescue (*Festuca duriuscula*), various-leaved fescue (*Festuca heterophylla*) and fine-leaved fescue (*Festuca capillata*). The last named has comparatively small and smooth seeds and can be distinguished from the others by these characteristics. The other kinds are practically indistinguishable by an examination of their seeds, and it is claimed that they are much mixed in the trade. At present we know of no way by which the seed of the creeping red fescue produced in Alberta, Canada, can be identified with certainty; so assurance rests upon direct dealing with the producer or with a reliable agent.

Two kinds of sweet vernal grass seed come from Europe; one the perennial sweet vernal grass (*Anthoxanthum odoratum*), the other the annual sweet vernal grass (*Anthoxanthum puelii*). A greenkeeper would have to see the two kinds together in order to distinguish them. Unhulled seed of the perennial kind is darker reddish brown than the other, as is also the hulled seed. The thin tip of the outer scales of the seed of this kind is rounded, while in the other kind it is usually notched. Seeds of crested dog's-tail and of Bermuda grass are generally recognizable because of the absence of other closely related kinds accompanying them.

Redtop is classed as one of the bent grasses, in books on botany. The bent grasses (species of *Agrostis*) probably represent the most important group of closely related turf grasses with which the greenkeeper has to deal. Part of the seed on the market is domestic-grown and part is imported. The fact that there are several kinds, the multiplicity of names both common and botanical, the small size and similarity of the seeds, the frequent misnaming and adulteration in the trade, all combine to render the greenkeeper practically helpless in identifying this class of seeds. While redtop may have a legitimate place in the list of golf course turf grasses, a person trying to get seed of one of the fine bents does not want to have redtop supplied him in place of it either accidentally or intentionally. The similarity of the seeds of bents doubtless has led to many trade errors in labeling. It also has led to much intentional adulteration of the more expensive fine bent seed with the cheaper redtop, sometimes redtop being wholly substituted for the fine bent. In one instance a large shipment of American grown redtop went to New Zealand, then came back as New Zealand grown browntop or colonial bent. In another instance American redtop sent to Germany was resold in the United States as genuine German bent. These were cases of complete substitution of redtop. Many instances of adulteration, varying in extent, are on record. Because of the coarse character of redtop turf, unfitting it for the more exacting requirements of the golf course, and the relatively low price of its seed, inviting its use as an adulterant, we are becoming inclined to refer to the commercial kinds of *Agrostis* as redtop and the bent grasses.

The most widely used and produced kind of bent seed is that generally known in the United States as Rhode Island bent, for which the name colonial bent recently has been adopted by the United States

Department of Agriculture. It has been produced commercially in Rhode Island. It is now being produced in limited quantity in Washington and Oregon. Much seed is harvested on Prince Edward Island, Canada, from fields which have been certified under government inspection as practically free from redtop. This well re-cleaned seed is sold in the United States as Prince Edward Island bent. Large quantities of this seed are received in well cleaned condition from New Zealand. This seed is the chief ingredient of the mixed bent seed produced in southern Germany, velvet bent seed being the other valuable ingredient, varying much in its proportion. Some lots of the German seed are essentially pure colonial bent, aside from the chaff which is almost invariably prevalent in the German seed.

Seaside creeping bent, as its name suggests, is primarily a seacoast grass, but it is known to grow naturally inland. The bulk of the seed on the market is produced on the Oregon-Washington Pacific coast, chiefly in southwestern Oregon. Seed marketed under the trade name "Cocoos bent" is produced in the region of Coos County, Oregon. Some seed of creeping bent has been produced on Prince Edward Island, Canada. It is now under production in New Brunswick, Canada. The seed produced in Canada is certified by the Canadian Department of Agriculture after field inspection. Creeping bent has a pronounced capacity for spreading by means of over-ground trailing and rooting stems.

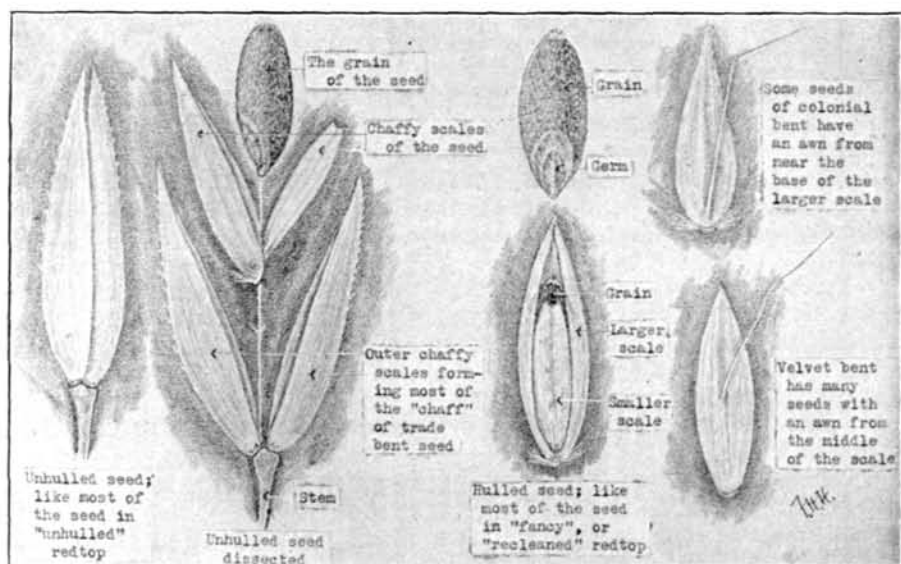
Velvet bent, admired for the fine quality of its turf, is also a stoloniferous grass, from which especially desirable strains are being developed. Until recently, seed of this grass was known in the United States only as an ingredient of the mixed seed coming from Germany. Now, seed, more than half of which is seed of velvet bent, is produced on Prince Edward Island, and very pure seed has been produced in Alberta, Canada.

Two new forms of bent being produced in Oregon are now becoming established in the trade. In Oregon, both spread widely by underground stems and appear to have much promise as turf grasses suited to golf purposes. One of these is Astoria bent, produced near Astoria, in northwestern Oregon. The other has been marketed as Oregon bent and is a highland grass of interior Oregon. Both are believed to be varieties of the colonial bent previously discussed.

"Hybrid seed" is a term being applied to a form of bent seed coming from Germany under the names "creeping bent" and "German bent," implying that it is the same as the South German mixture of colonial and velvet bents. This seed probably has been a variable ingredient of the German mixture for many years, but within recent years it has been practically all the seed of some lots. The real nature of the plants produced from this seed is not now known here; but the plants are under study and it is expected that more will be known about them in the near future. In the meantime, this seed is distinguishable from that of the other commercial kinds.

The question has been asked, "To what extent can the greenkeeper identify the seed of redtop and the fine bents?" The general impression is that he is not properly equipped or prepared to do this accurately. The seeds are so small, and the points of distinction so minute and obscure, that most of them can not be seen even with the aid of the best hand-magnifier. A compound microscope is necessary, and even with that one must know what to look for and be able to

interpret what he finds. Not all seed analysts equipped with a microscope are prepared to make these identifications. The seed now appearing in the trade can be identified as to kind under most conditions. In mixtures of certain kinds, it is very difficult to distinguish all of the seed of each kind in a test sample, which must necessarily be very small to permit the work being done at all. In making determinations of this kind, the problem varies with the conditions involved. Thus with a mixture of redtop and creeping bent seeds, practically accurate determination of the true proportions of ingredients is possible; but with a mixture of colonial bent and Astoria bent seeds an accurate determination of proportions is not now known to be possible.



Structure of the seed in redtop and bent grasses, which may be seen with the use of a good hand-magnifier

A general understanding of the means by which the different kinds of bents may be distinguished by their seed may be gathered from an explanation of the structure of the seed in the group *Agrostis*. At the time of flowering, a single flower terminates each ultimate branchlet of the flower cluster. Each flower produces a single seed, which until maturity remains enveloped by two similar chaffy scales which have little, if any, value as indicating the particular kind of bent. Removal of the two chaffy scales exposes what is here referred to as the "seed," consisting of the grain containing the germ and surrounded by two additional scales, one longer than the grain, the other shorter, thin, and transparent. The longer scale has a slender bent bristle, or awn, from near its base in some of the seeds of colonial bent, including the Astoria and Oregon varieties, but in none of the others. These awns are noticeably numerous in seed of the Astoria, some of the seeds of which are unusually large and robust for these three kinds. The surface of this scale in these kinds is comparatively dull and the seeds average smaller than those of redtop and creeping

bent. These features are somewhat evident under a good magnifier. The length of the shorter transparent scale, and whether its tip is notched, rounded, or truncate, are important points to consider in naming the seed. The magnifier is of little use in observing these points. Seeds of redtop and creeping bent, also the "hybrid" seed, are more or less shining on the longer scale about the grain. This is somewhat evident under the hand-magnifier and may be useful in disclosing the presence of the "hybrid" seed in German bent seed. This "hybrid" seed is very much like redtop, but mostly smaller and more slender. Other structural features necessary to use are too obscure to justify consideration here. Velvet bent seed may be distinguished from all the other commercial kinds with a good hand-lens, since the individual seeds are dull, the surface of the longer scale around the grain being finely roughened and often awned from the middle, the smaller scale being so small that it is practically invisible, and the grain soft with a semifluid interior while the grains of all the other kinds are hard and mealy.

The kind of the bent seed coming before the analyst often is suggested by the evident origin of the seed. The region of production, or origin, of the seed is indicated chiefly by the seeds of other kinds of plants usually present with the bent seed. Some of these associated seeds are those of weeds, others those of cultivated crops. One can readily understand that plants growing naturally, and even certain cultivated crops, will differ in kind in regions remote from each other. Thus German bent seed usually contains seeds never found in seed of any of the bents produced in the United States or Canada. The same applies to seed grown in different sections of the latter regions. The greenkeeper's hand-magnifier would be very useful if he could know the origin-indicating seeds and had sufficient patience to find them.

The chaff of German bent seed usually indicates the origin of this seed, because it consists chiefly of the two outer scales of the seed separated from the heavier stem, and is therefore very fine and light in weight. It varies from 20 to 60 per cent of the total weight of the bulked seed. The virtue of its presence in the seed probably is best appreciated by the foreign dealers when they think of the price per pound paid by American consumers.

The evolution of better turf grasses is by no means complete. Throughout the whole great realm of animal and plant life the process of evolution is ceaselessly though silently going on. In this development the hand of man plays no small part. In 1840 the average weight of fleece sheared from American sheep was less than 2 pounds. By 1900 it had been increased, through selection and breeding, to nearly 5½ pounds. Today it is approaching 8 pounds.

The house wren, for all its diminutive size, is a most useful bird, says the Bureau of Biological Survey. It feeds almost exclusively on harmful insects, and as it usually rears two broods a year the parents are kept busy from morning till night searching for food. This wren's only bad habit is to interfere with the nests of other birds.