

## Changes in the Bent Grass Seed Market as Viewed by the Seed Analyst

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Because of the growing interest in golf turf, the production and sale of bent grass seed has become a subject of interest to many. The seed laboratory of the United States Department of Agriculture in examining samples of seed of bent grass, including those representing the importations, is in a position to note changes occurring in the character and kinds of seed offered for sale. Comparing the bent grass seed on the market today with that available 10 years ago, one is impressed with the greater dependability of names, the greater number of kinds offered, the decrease in the number of cases of deliberate mixing or substituting, and the improvement in the character of the seed offered, with respect to the quantity of chaff and inert matter contained.

The improvement noted has dated from the publication in July, 1918, of the United States Department of Agriculture Bulletin No. 692, entitled "The Agricultural Species of Bent Grasses," by Charles V. Piper and F. H. Hillman. The work of Dr. Piper in describing the plants and clarifying the nomenclature is responsible for the more intelligent use of common and technical names among seedsmen and botanists, and the work of Mr. Hillman in discovering and describing differences in the seeds has enabled analysts to detect mixtures so that the practice of adulteration and substitution by seedsmen both here and abroad has been greatly discouraged.

Previous to the publication of that bulletin, the name *Agrostis canina* was commonly applied to Rhode Island bent, and the name *Agrostis stolonifera*, appearing on importations of bent grass seed which were supposed to contain creeping forms of *Agrostis*, was applied to all bents then on the market. These mistakes were due largely to the confusion existing among botanists as to the botanical identity of the plants. Piper's work in the clarification of the nomenclature was followed by a more careful use of technical names by seedsmen. Mention might be made of certain apparently unavoidable inconsistencies which still prevail in the use of common names. The name "creeping bent" is commonly used for any bent regardless of whether or not the plant is stoloniferous, and the name "Rhode Island bent" is applied to seed of *Agrostis capillaris*<sup>1</sup> whether it grows in New Zealand, Europe, Canada, or the State of Washington. At present, there is no common name for *Agrostis capillaris* applied to the seed of this species irrespective of the locality in which it is grown. The name "Rhode Island bent," correctly used, should apply to *Agrostis capillaris* grown in New England, but in the absence of any other common name for this species, the name "Rhode Island bent" has been used for seed produced in various regions. Many seedsmen, however, are using names which clearly indicate the source of the seed, as for example "Prince Edward Island-grown Rhode Island bent" and "Washington-grown Rhode Island bent."

<sup>1</sup> *Agrostis capillaris* L.—*Agrostis tenuis* Sibth. *Agrostis vulgaris* With.

## INCREASE IN NUMBER OF KINDS FOR SALE

Previous to the World War, the purchaser of bent grass seed had the choice of buying either Rhode Island bent (*Agrostis capillaris*) or South German mixed bent, the latter usually consisting of *Agrostis capillaris*, *Agrostis canina*, and *Agrostis stolonifera major*.<sup>1</sup> The Rhode Island bent (*Agrostis capillaris*), grown in New England, contained a high percentage of leafage and chaff and generally a little redtop (*Agrostis stolonifera major*). The South German mixed bent was very chaffy and the percentages of the different ingredients varied considerably in different lots, many of them consisting of more than half redtop.

Today, seed of the following kinds can be bought: Rhode Island bent<sup>2</sup> (*Agrostis capillaris*), South German mixed bent consisting of *Agrostis capillaris* and *Agrostis canina*, seaside bent (*Agrostis stolonifera palustris*),<sup>3</sup> and velvet bent (*Agrostis canina*).

Rhode Island bent (*Agrostis capillaris*).—The seed of Rhode Island bent (*Agrostis capillaris*), on the market at the present time, is grown in various places and much of it is free from the seed of the other species of *Agrostis*. Seed from New Zealand, called "brown top," "Waipu," or "Colonial bent," and from the state of Washington is, as a rule, all *Agrostis capillaris*. That grown in Prince Edward Island, Canada, contains sometimes a little seed of velvet bent (*Agrostis canina*). The South German mixed bent as imported today usually is not mixed with redtop (*Agrostis stolonifera major*). Its principal ingredient is *Agrostis capillaris*, and the *Agrostis canina* present varies from a trace to a third of the sample.

Seed believed to be that of *Agrostis capillaris* has been grown in Oregon and has been put on the market under the names of "Golfalawn" and "Astoria bent." This is said to be a creeping form. The seed examined appears to be all *Agrostis capillaris*, but our present knowledge is not sufficient to determine whether or not the seed represents only the creeping form.

Seed of an *Agrostis*, also believed to be a variety of *Agrostis capillaris*, has recently appeared on the market in small quantities under the name of "Oregon bent." This seed can be distinguished from that of other bents, and has been recognized in bent seed from New Zealand.

Seaside bent (*Agrostis stolonifera palustris*).—Seed of seaside bent was for sale for the first time in this country in 1924, and since that time has been available in considerable quantity. While this plant grows abundantly on both seacoasts in the northern United States and Canada, most of the seed commercially available is produced in Oregon and Washington.

Velvet bent (*Agrostis canina*).—Seed of velvet bent (*Agrostis canina*) formerly was not obtainable except as an ingredient of the South German mixed bent. It appears also in very small proportion

<sup>1</sup> This name as applied to redtop is preferred to that of *Agrostis alba* by Dr. A. S. Hitchcock, principal botanist in charge of systematic agrostology, United States Department of Agriculture. Dr. M. O. Malte also uses this name in "Commercial Bent Grasses (*Agrostis*) in Canada," published in 1928, in the Annual Report for 1926, National Museum of Canada.

<sup>2</sup> Rhode Island bent; name used here in the absence of a common name to apply to *Agrostis capillaris*, irrespective of the region in which it was grown.

<sup>3</sup> *Agrostis stolonifera palustris* Huds.—*Agrostis maritima* Lam. *Agrostis stolonifera palustris* Huds. is the name recommended by Dr. Hitchcock. Dr. Malte is using the name *Agrostis stolonifera compacta* Hartm.

in seed of *Agrostis capillaris* from Prince Edward Island. This year, for the first time, importations of velvet bent seed have been received. The seed received was grown in Alberta and the official samples examined were of high purity with only a trace of *Agrostis capillaris*. The importations were small, but there is every reason to expect in the future larger shipment of this seed.

Creeping bent.<sup>1</sup>—*Agrostis* sp. Small quantities of this seed have been produced, but as yet it can not be said to be on the market. The plant does not produce seed readily and because of the success in reproducing the plant vegetatively, by the planting of stolons, the demand for seed is not urgent.

#### DECREASE IN NUMBER OF CASES OF MIXING

The great similarity in the appearance of seed of redtop and seed of the bent grasses, and the high price obtained for bent with the low price of redtop seed, have led to the mixture of bent grass seed with that of redtop and the substitution of seed of redtop for that of bent. Previous to the studies of Mr. Hillman on the distinguishing characters of the seed, analysts were unable to detect mixtures and this practice went on unchecked. Our main supply of seed came from Holland and Germany, where dealers made a practice of importing American redtop for the purpose of adulterating their seed. To quote from Mr. Hillman in United States Department of Agriculture Bulletin No. 692: "The importations of *Agrostis* during 1916 represented 48 lots, totaling 46,664 pounds. Two lots, amounting to 1,508 pounds, consisted of redtop only. One lot only, of 3,900 pounds, was South German mixed bent grass seed. The remaining 45 lots, totaling 41,255 pounds, came from a single firm in Arnheim, Holland. The seed in each of these lots was chiefly redtop, together with South German mixed bents, varying in quantity from a mere trace to an appreciable proportion. Of the 48 lots imported in 1916, 27 were entered as "creeping bent," 17 as "Rhode Island bent," 2 as "*Agrostis canina*," 1 as "*Agrostis stolonifera*," and 1 as "redtop." One of the two lots of redtop was imported as "redtop," the other as "creeping bent."

No data are available showing exactly how extensively the practice of mixing was carried on, as the adulterated seed investigation carried on every year by the Federal seed laboratory has never been extended to cover bent grass seed. The laboratory has on hand only the records of examinations of samples sent in voluntarily for examination or test. As samples of the same lot of seed may have been sent in from several sources, the information taken from the analyses can not be interpreted as an exact picture of trade conditions. However, a study of the analyses over a period of 10 years does show the changes in the character of a large part of the seed on the market.

The records show that from July 1, 1917, to June 30, 1918, inclusive, 35 samples of *Agrostis* seed were received bearing one or another of the following labels: "Rhode Island bent," "creeping bent," "German bent grass," or "South German bent." Of these, 15 were all redtop, 2 contained only a trace of bent, and 2 were mixtures;<sup>2</sup> one of the mixtures contained more than 50 per cent of redtop.

<sup>1</sup> Technical name undetermined.

<sup>2</sup> The words "mixture" and "mixed" as here applied to seed of bent grass and redtop imply that when the two are present as component parts the smaller part must be at least 10 per cent of the entire sample.

The next year's analyses include those of Colonial bent, and as this seed is imported free from the seed of redtop, one would expect a larger proportion of unmixed samples. Thirty-five samples were received labeled with one or another of the following names: "creeping bent," "English creeping bent," "Rhode Island bent," "German creeping bent," and "Colonial bent." Twenty of these were mixed with redtop. Of the 18 samples of "Colonial bent" received for test, 8 were mixtures.

Judging from the number of samples of bent grass seed received for test which were mixtures of redtop and bent, conditions remained about the same until July, 1922. From July 1, 1922, to June 30, 1923, inclusive, 62 samples were received, of which only 10 were mixtures. Of the 52 samples which were not mixtures, 8 were reported as appearing to contain no redtop, and 9 as containing only a trace.

From the year 1922 to the present time, the analyses show a diminishing number of cases of mixing in proportion to the number of samples received. In the period from July 1, 1927, to June 30, 1928, inclusive, 67 samples were submitted as bent. Of these, only 2 were mixtures. In addition, 77 samples of bent grass were received which were not named. Of these, 4 were mixtures of bent grass and redtop.

The greater number of unmixed lots of bent grass on the market today is due largely to the improved character of the importations, and this improvement has seemingly followed as a result of competition and the attention given by this laboratory to the samples representing the importations.

The Seed Importation Act of 1912 prohibited the entry of forage crop seed into the United States which contained 3 per cent of weed seeds or 5 per cent of an adulterant. This act did not apply to seed of bent grass except as it contained, as a component part (10 per cent or more), seed which was designated as coming under the terms of the act. As redtop was subject to the act, previous to the amendment of April, 1926, samples of bent grass seed received through the Customs were examined to determine if they contained 10 per cent of redtop. Mr. Hillman's examination of the 1916 samples showed that the Seed Importation Act of 1912 did not immediately discourage the mixing of bent grass seed with that of redtop. A few years later, however, examination showed that in many samples the redtop present amounted to 10 per cent of the pure seed (*Agrostis* species free from inert), but in comparatively few samples did the redtop seed amount to 10 per cent of the sample, due to the low pure seed percentage.

Toward the end of the year 1920, two years after the publication of Department of Agriculture Bulletin No. 692, the seed laboratory began to receive samples of South German mixed bent grass seed which were practically free of redtop. It so happens that the 27 samples of bent grass, representing all the importations of that seed from January, 1921, to June, 1921, are still on hand. Reexamination of these samples shows that 6 of them are practically free of redtop. Comparison of the importations of 1928 with those of 1921, shows a marked increase in the proportion of samples which are practically free of redtop. Seventy of the 82 samples of South German mixed bent received during the period from January 1, 1928, to October 1, 1928, inclusive, apparently contained no redtop.

## INCREASE IN NUMBER OF WELL-CLEANED LOTS

The small proportion of chaff and inert matter in the bent grass bought today is also worthy of note in view of the high proportion which was always present in the seed of 10 years ago. The highest pure seed percentage recorded for the 24 samples tested in the period from July 1, 1918, to June 30, 1919, was 73.29, the lowest 32.84, and the average 49.67. Of the 79 samples submitted for purity approximations in the period from January 1, 1928, to September 30, 1928, the highest pure seed percentage was 99, the lowest 60, and the average 82. The above comparison relates to samples received exclusive of those received from the collectors of customs.

The samples representing the importations submitted by the collectors of customs have been tested for approximate purity only since July, 1925, and only when the amount of work on hand permitted. The accompanying tables show the gradual improvement in the pure seed percentages as shown by the purity approximations made in 1926, 1927, and part of 1928. The samples examined in 1926 and 1927 represent all the samples of bent grass seed received, while those in 1928 represent only those received from May 1 to September 30. Purity approximations were not made of the samples received in the period from January 1, to April 30, 1928, on account of the great pressure of other work on hand.

## SOUTH GERMAN MIXED BENT

Year	Number of samples	Highest	Lowest	Average	Samples	Samples	Samples
		purity	purity	purity	between	between	between
		<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>	70 and 80	80 and 90	90 and 100
1926.....	127	97	52	69	23	9	2
1927.....	128	93	56	75	32	23	2
1928.....	<sup>1</sup> 34	96	64	80	35	20	20

## COLONIAL BENT

Year	Number of samples	Highest	Lowest	Average	Samples	Samples	Samples
		purity	purity	purity	between	between	between
		<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>	70 and 80	80 and 90	90 and 100
1926.....	23	99	52	85	13	13	47
1927.....	18	98	92	95	..	..	100
1928.....	<sup>1</sup> 21	99	93	97	..	..	100

## PRINCE EDWARD ISLAND-GROWN RHODE ISLAND BENT

Year	Number of samples	Highest	Lowest	Average	Samples	Samples	Samples
		purity	purity	purity	between	between	between
		<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>	70 and 80	80 and 90	90 and 100
1926.....	8	93	89	91	..	37	63
1927.....	20	97	90	92	..	10	90
1928.....	<sup>1</sup> 2	93	88	90	..	50	50

In reviewing the changes that have occurred in the production and sale of bent grass seed in the last 10 years, it is evident that the work of seed analysis has played an important part. The identification of

<sup>1</sup> All of the samples for which purity approximations were made, which include only those received in period from May 1 to September 30, 1928.

the seeds of the different kinds of *Agrostis* is one of the most difficult problems of seed testing. The work requires the use of a magnifier of high power (30 diameters or more), and considerable study is necessary to become familiar with the differences between the seeds of certain kinds. The appearance of new varieties makes the work more difficult, and ability to identify them requires more and more intensive study. The seed studies by Mr. Hillman and the subsequent analyses of hundreds of samples have created an interest in better seed, and the seedsmen's response to this interest has been the improvement here described.

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### Parasitic Control of the Japanese Beetle

Readers who live in the area already infested or threatened with the Japanese beetle will doubtless be interested in all phases of the work being done by Federal and State scientists in the control of this destructive pest. The lead arsenate method of poisoning soil is proving effective in preventing the ravages of the beetle in turf, but these insects, even though checked in turf, may seriously mar the beauty of a golf course by their destruction of the foliage of trees and shrubs. Entomologists of the United States Department of Agriculture have been trying for several years to introduce into the United States, from the Orient, some of the natural parasites which hold the pest in check in its native home. Clubs in and near New Jersey will accordingly be interested in the following report which has appeared in *The Official Record*, one of the publications of the United States Department of Agriculture:

"At the present time five species of oriental parasites of the Japanese beetle are established in New Jersey, there being two species of *Tiphia* wasps and one each of the flies *Centeter*, *Dexia* and *Prosenia*. *Tiphia vernalis* has been recovered for the first time from a colony that was established two years ago. The same species has been recovered from three colonies established last year. *Dexia ventralis* has been recovered, both this year and last year, from the first colony established. Twenty-three thousand *Tiphia* cocoons have been received this year from India, and a shipment of 3,000 adult *Tiphia vernalis* from Japan arrived in good condition, with 42 per cent alive. Five thousand *Prosenia sibirita* were received from Japan on parasitized grubs."

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### Notice of Annual Meeting

The annual meeting of the United States Golf Association will be held on Saturday, January 5, 1929, at the Hotel Commodore, New York City, at 12 o'clock noon.

The Green Section Committee of the United States Golf Association has arranged to hold meetings at the Hotel Commodore, New York City, on Friday, January 4, at 10 a. m. and 2 p. m.; also a meeting on Saturday morning, January 5, at 9 o'clock. A number of interesting papers will be read, supplemented by a report of the work of the Green Section during the past year.