Sources of Golf Course Grass Seed

The harvesting and cleaning of bent seed were described in the November number of the Bulletin. The current number is devoted to a consideration of the harvesting of the other grass seeds that are commonly used on golf courses. Golf club officials are probably more interested in the different sources of bent seed in spite of the fact that the total consumption of bent seed on golf courses is far less than the consumption of all the other seeds considered in the current number of the Bulletin.

The entire supply of seed of some golf course grasses is produced in this country while the seed of other golf course grasses is practically all imported. Seed of Kentucky bluegrass, Bermuda grass, and redtop is imported only occasionally, and then only in small quantities and with the probability that these importations represent American grown seed which has been exported and shipped back to the United States. The supply of seed of such grasses as the fescues, Canada bluegrass, and crested dog's-tail is practically all imported. The seed of other grasses, notably the bents and rye grass, is grown in the United States and is also imported in large quantities. On pages 220 and 221 of this Bulletin is shown the number of pounds imported yearly during the past four years of seed commonly used on golf courses and in mixtures for lawns or other turf purposes. The figures are furnished by the seed laboratory of the United States Department of Agriculture. The list contains many interesting figures as well as information as to the principal sources of our grass seeds shipped from abroad. Unfortunately there are no records kept of the total production of most of these seeds in the United States. The Bureau of Agricultural Economics of the United States Department of Agriculture keeps a record of production estimates of most of our principal agricultural crops. Kentucky bluegrass and redtop are the only two golf course grasses that are regarded as major agricultural crops of which records are kept. The records of the Bureau of Agricultural Economics on the production of seed of these two grasses are given on page 222 of this number of the Bulletin. Estimates on the production of seed of a few of the other grasses are made by state agricultural workers in the states chiefly interested in such production.

From the list of importations it will be seen that some grass seeds are received from a number of foreign countries while others come from only a single country. Bent seed has been received during the past four years from seven different countries although it is indeed probable that much of it has been shipped from the country in which it was harvested to dealers in some other country, and from the latter country reshipped to the United States. Italian rye grass has been received from more than ten foreign countries although, as is indicated in the list, reshipment was undoubtedly made in some cases. The actual country of origin of seed can be determined by an expert seed analyst by means of either certain distinctive weed seeds contained in the sample or certain definite characteristics of the seed itself. In the case of carpet grass, for instance, the only importations have come from Australia. As is pointed out by one of the contributors to this number of the Bulletin, the carpet grass seed harvested in the United States comes from a limited area. Practically all the available carpet grass seed used in the United States

therefore comes from two distinct regions, one in the United States and the other in Australia. Canada bluegrass is a species of grass the seed of which comes from only one source. When the seed of any grass comes from only one or a few sources the available supply on the market is likely to be much more uniform than in the case of seed coming from many different regions. Italian rye grass is an example of grass the seed of which comes from many countries, with the consequent increase in the likelihood of variations. In recent years there has been a rapid growth in the domestic rye grass industry. Practically all the domestic seed is grown in Oregon and is of a mixed nature. There are small amounts of pure Italian and pure perennial rye grass seed harvested, but most of the seed is a mixture of these two and is sold as western rye grass. In 1924 the production was from 50 to 60 tons. In 1930 the production was over 3,500 tons. This seed sells comparatively cheaply, bringing from 3½ to 5 cents a pound to the grower, and on account of its low cost is being used extensively in lawn grass mixtures and to some extent in replacing Italian rye grass for seeding winter turf in the South.

The importations of bent grass seed in 1930 amounted to 120 tons more than in any of the four preceding years. There was a decrease in importations from Germany, but it was insignificant as compared with the importation of 254 tons of colonial bent seed from New Zealand, which is more than three times the amount imported in any of the four preceding years. There is probably an increase in the use of bent, colonial bent in particular, for fairway and lawn mixtures, but some of this increase was probably due to dealers' increasing their reserve stocks before the new tariff became effective. Our American bent growers will no doubt make every effort to supply the bent seed needed in the future, and there seems to be required only a guarantee of sufficiently high prices to induce the growers to plant thousands of acres more for bent seed production. Even without a protective tariff, production in the United States has more than doubled since 1925. The new bent-growing region in the Pacific Northwest is responsible for this increase in home-grown bent seed. Bent seed production in New England dropped from 62 tons in 1924 to 20 tons in 1927 but increased to 32½ tons in 1930. The production in the Pacific Northwest, on the other hand, has increased from only a few hundred pounds in 1924 to 5 tons in 1925 and 125 tons in 1930.

The price of grass seed is affected primarily by the same laws of supply and demand that affect the prices of other commodities. The golf club market, in the case of bent seed for example, represents a big proportion of the total demand. The demand from golf clubs for other grass seeds such as those discussed in this number of the Bulletin represents a relatively small part of the total market, for these grasses are widely used for pastures and lawns. Many different conditions affect, in varying degrees, both the supply and the demand, and these in turn naturally influence the market prices. It is beyond the scope of this Bulletin to enter into a detailed discussion of the many influences, but it is interesting to note a few of the many factors that may have some bearing on the price of seeds that are purchased by golf clubs.

The method used in producing the crop of seed determines the cost of production, which in turn influences the supply and the price.

Receipts of Turf Seeds from the Various Exporting Countries, 1926 to 1930

In some instances other than those cited below, the seed has apparently originated in a country other than the exporting country

	1927 Pounds	1928 Pounds	1929 Pounds	1930 Pounds
Bent Grass				
Australia	100	.....	.....	.....
Canada	20,600	61,300	13,700	.....
England	17,100	11,200	5,400	1,200
Germany	388,500	349,200	336,900	294,000
Holland	74,900	85,700	130,000	86,000
New Zealand	35,800	44,800	162,600	508,900
Scotland	1,700	.....	.....	.....
Total	538,700	552,200	648,600	890,100
Redtop				
Holland	2,200	.....	.....	.....
Denmark	.....	.....	.....	4,400
Germany	.....	.....	.....	500
American seed returned	1,100	.....	.....	.....
Total	3,300	.....	.....	4,900
Rough-Stalked Bluegrass				
Australia	300	.....	.....	.....
Canada	.....	.....	200	.....
Denmark	145,200	235,800	127,600	272,000
England	1,000	2,600	2,000	3,200
Germany	5,200	8,900	120,500	33,600
Holland	16,200	36,500	33,400	33,000
Scotland	2,400	2,200	22,100	5,500
Total	170,300	286,000	305,800	347,300
Wood Meadow Grass				
Australia	200	.....	.....	.....
Denmark	.....	.....	.....	4,400
England	200	800	.....	.....
France	.....	.....	.....	400
Germany	14,000	27,600	21,300	7,600
Holland	9,300	10,900	7,100	8,300
Total	23,700	38,800	28,400	20,700
Canada Bluegrass				
Canada	881,700	1,101,900	1,227,800	608,000
Chewings' Fescue				
Australia	.....	.....	100	.....
Belgium	.....	.....	600	.....
Canada	200	300	.....	.....
England	12,300	22,400	.....	.....
New Zealand	941,100	1,083,500	1,446,400	987,900
Scotland	.....	500	5,600	.....
Total	953,600	1,106,700	1,452,700	987,900
Other Fescues				
Canada	.....	400	1,900	.....
Denmark	24,400	6,900	.....	.....
England	14,800	3,700	10,500	.....
Germany	243,200	305,400	445,400	505,400
Holland	97,800	110,600	201,400	118,400
Scotland	3,400	.....	12,200	.....
Total	383,600	427,000	671,400	623,800

Receipts of Turf Seeds from the Various Exporting Countries, 1926 to 1930

In some instances other than those cited below, the seed has apparently originated in a country other than the exporting country

	1927 Pounds	1928 Pounds	1929 Pounds	1930 Pounds
Carpet Grass				
Australia	3,000	13,600	7,000	7,300
Perennial (English) Rye Grass				
Canada	.....	.....	.....	100
Denmark	.....	20,000	21,500	6,000
England	57,800	8,800	10,600	13,100
France	.....	.....	400	.....
Germany (1930 importation was of Irish origin)	.....	.....	2,100	17,400
Holland	.....	1,000	3,700	2,500
Ireland	578,500	624,000	886,900	696,200
New Zealand	378,600	340,200	138,000	11,600
Scotland	187,900	88,800	116,700	189,700
Of Australian origin	.....	.....	.....	500
Total	1,202,800	1,082,800	1,179,900	937,100
Italian Rye Grass				
Argentina	.....	.....	.....	44,800
Canada (of Dutch origin)	.....	.....	1,200	.....
Denmark	230,900	72,000	42,500	73,100
England	1,300	.....	.....	.....
France	76,100	21,800	.....	.....
Germany (of Irish origin)	.....	.....	.....	4,500
Holland	500	1,900	600	3,900
Ireland	372,400	167,400	102,800	94,600
New Zealand	34,400	187,200	115,300	13,600
Scotland	117,600	5,400	37,400	9,000
Other countries	.....	200	200	.....
Of Australian origin	.....	.....	.....	400
Total	833,200	455,900	300,000	243,900
Crested Dog's-Tail				
Australia	300	.....	.....	.....
England	100	4,500	4,100	.....
Germany	.....	.....	400	.....
Holland	2,600	3,800	17,300	1,800
Ireland	9,400	8,400	10,000	7,700
New Zealand	5,700	38,600	46,800	12,100
Total	18,100	55,300	78,600	21,600
Perennial Sweet Vernal Grass				
Germany	300	.....	100	.....
Holland	200	600	200	300
Total	500	600	300	300
Annual Sweet Vernal Grass				
Germany	.....	2,200	2,200	.....
Yarrow				
Germany	100	.....	.....	.....
Holland	200	400	.....	200
New Zealand	.....	800	1,000	400
Scotland	.....	.....	500	.....
Total	300	1,200	1,500	600

The method of obtaining Bermuda grass seed largely as a by-product of the alfalfa seed harvest presents an interesting contrast with the method of obtaining bent seed in some sections where ground is prepared for sowing a grass crop and the land is devoted primarily to the production of seed of that crop. In the case of Kentucky bluegrass the seed crop is in a sense a by-product of pastures, while on the other hand redtop seed represents the principal income from the land on which it is produced.

The annual production and the wholesale price during the spring season of seed of Kentucky bluegrass and redtop for the years 1926 to 1930, inclusive, are shown in the accompanying table. Practically no seed of these two grasses is imported; the factors influencing yields and prices are therefore primarily domestic. These grasses are used extensively on farms and lawns and for other turf as well as for golf course purposes. The figures are furnished by the Bureau of Agricultural Economics, United States Department of Agriculture.

Annual Production and Wholesale Spring Prices of Seed of Kentucky Bluegrass and Redtop from 1926 to 1930

	Kentucky Bluegrass		Redtop	
Year	Production in bushels	Wholesale pound price	Production in pounds	Wholesale pound price
1926	2,000,000	38 cents	8,300,000	31.25 cents
1927	1,800,000	20.5 cents	18,000,000	25.30 cents
1928	300,000	19.7 cents	14,250,000	13.10 cents
1929	1,350,000	31.3 cents	7,500,000	14.60 cents
1930	700,000	20 cents	6,000,000	16.45 cents

An important element influencing the price of any crop is the cost of the land on which it is produced. Kentucky bluegrass and redtop are grasses widespread on farms and in the case of each the seed production is an old industry centered in certain well-defined areas. Kentucky bluegrass seed is produced on rich grazing land and the seed crop is secondary to the importance of the pasture. The seed is stripped green from the pastures and must be cured by a process lasting from two to four weeks and requiring the piles of seed heads to be turned frequently by hand in the early stages of the process. Redtop, on the other hand, is produced on poor land. The industry is located in one large area with 2,500,000 acres under production. The 1,700 farmers engaged in the industry harvest and thresh their own crops and the seed is cleaned largely by local dealers. No particular care is given the fields, the sod being plowed under when the fields become too weedy and later they are reseeded. The fields are pastured in the spring and fall before and after the hay is cut. The crop is handled as for hay until it is threshed. The seed yield is lower than with Kentucky bluegrass but the cost of harvesting is less. Redtop land is cheaper than Kentucky bluegrass land and it is doubtful if it could be used for more profitable crops.

The total production of any grass seed, like the production of any crop, is largely dependent on climatic conditions. The drought and cold weather of the spring of 1930 accompanied by a late season were largely responsible for the marked decrease in the production of Kentucky bluegrass seed in 1930. The reduction in yield, however, does not always make immediate corresponding advances in the price of the seed. The previous year's crop and the amount of seed carried over have much to do with price fixing.

It is of interest to note that the retail prices of bluegrass and redtop seed have varied proportionately with the wholesale prices during the last three years. One large retailer's seed prices for the same quality of Kentucky bluegrass seed varied $10 a hundred pounds in the past three years, redtop $1, and colonial bent $35. The price of colonial bent seed averaged about 3 times that of Kentucky bluegrass and 4½ times that of redtop. The steadiness of redtop prices and the wide range of colonial bent prices illustrate the staple nature of the redtop seed industry as compared with the bent seed industry. The similarity of the seed of redtop and bent makes it easy for unscrupulous dealers to adulterate the bent with redtop, to their profit.

The bent seed industry is more specialized than are the other grass seed industries. The seed is the main crop, as is the case also with redtop seed; the seed is harvested for the most part in the same manner as redtop seed and is threshed in a similar manner, but usually more difficulty and expense are involved in cleaning the seed. The seed however is much more costly than any additional labor or machinery connected with the cleaning would account for. The bents, except in a few areas, are apt to become mixed in the fields. This is especially true of velvet bent seed, which to date has not been produced pure in appreciable quantities, due to the fact that it is grown in areas in which the predominating grasses are colonial bent and redtop. These grasses invade the velvet bent fields in spite of all precautions. Due to the similarity of the seeds of these three grasses it is impractical to separate them with available cleaning machinery. Velvet bent seed is somewhat lighter than the seed of redtop or colonial bent and more of it is therefore blown out with the chaff than is the case in cleaning the seed of other species of Agrostis. To a somewhat less extent the colonial bent seed industry is faced with the same problem of keeping the seed pure, only in this case it is the redtop that is the chief invader. Great care is often exercised to keep the fields free from redtop, for there is at present no machine for removing redtop seed from bent seed. Because the seeds of redtop and all the bent grasses appear identical to the layman, the whole bent seed industry has to go to considerable pains even after the seed is cleaned to prevent adulteration of the seed in the hands of the unscrupulous by mixing redtop with it. Some growers, particularly in the Pacific Northwest and Prince Edward Island, are having their seed certified as to purity before placing it on the market.

Another factor tending to put the price of bent seed above the price of seed of redtop and Kentucky bluegrass is that the bents are of little agricultural importance whereas there is a large and constant demand for redtop and bluegrass seed for pasture and hay crops. Bent seed does not reach its specialized trade without costly advertising, which is not necessary with seed of outstanding agricultural importance.

In Germany most of the bent seed is harvested by men, women, and children living in the region where it grows. The seed heads are stripped from the plant by hand, the plants being mostly scattered through thinly wooded country. The seed heads are usually hand-flailed, and later the seed may receive further cleaning. The more cleaning the seed receives the greater the percentage of chaff that is lost, and hence the total weight of the crop is reduced. Seed of German bent usually contains much chaff and is about 80 per cent pure

seed. The demand for this seed in the United States has depended mostly on the small percentage of creeping bent seed it contains and the somewhat larger percentage of velvet bent seed. The remainder of the mixture is mostly colonial bent with a small percentage of redtop. Usually the closer German mixed bent approaches 90 per cent or over in purity the more redtop it contains, which in many cases may be due to blowing the chaff from the pure mixed seed as harvested and adding the cheaper seed of redtop. The chaffy mixed seed from Germany is harvested at a comparatively much lower cost than similar seed can be produced in the United States. The colonial bent seed from New Zealand is apparently produced more economically than it has been possible to produce pure colonial bent seed in this country. There is now a protective tariff which will undoubtedly largely reduce seed importations from Germany, New Zealand, and Canada.

It has been evident, especially in the past few years, that the work of the seed analyst is playing an important part in keeping fine turf seeds pure. However, judging from some samples of seed received in 1930 from golf clubs, it is evident also that vigilance is still necessary. Golf clubs should purchase seed on a purity and germination basis, dealing only with reliable seed houses. Wherever there is doubt about seed it should be sent for analysis to one of the state seed laboratories, to a commercial seed laboratory, or to the United States Golf Association Green Section.

How Bermuda Grass Seed Is Secured

By S. P. Clark
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Bermuda grass is named after the Atlantic islands of the same name. It is now widely disseminated throughout the semiarid and subtropical regions where winter frosts are not sufficiently severe to kill its roots. The plant is perennial (living from year to year). It is propagated by means of seeds, jointed rootstocks, and aerial runners which take root at each joint. Seed produced in humid climates is not fertile. All commercial seed comes from the arid regions, such as southwestern United States or Australia. It is very hardy after once becoming established, living for months without moisture, and it is on record that it lived for over two years when submerged by the Saltan Sea (Imperial Valley, Calif.) making renewed growth when the water evaporated. Bermuda makes good pasture for cattle, horses, or sheep. It is a pernicious weed in the arid Southwest and very hard to eradicate when once established in cultivated fields. The principal source of seed comes as a by-product from threshing alfalfa seed—that is, alfalfa fields badly infested with Bermuda are allowed to produce seed, and when the alfalfa is cut the Bermuda is harvested and threshed at the same time. By the proper adjustment of screens in the separator the two kinds of seeds are segregated. Occasionally pasture fields growing on alkaline soil are allowed to produce a seed crop. When this occurs the crop is harvested with hay-making machinery and threshed with ordinary threshing machinery.