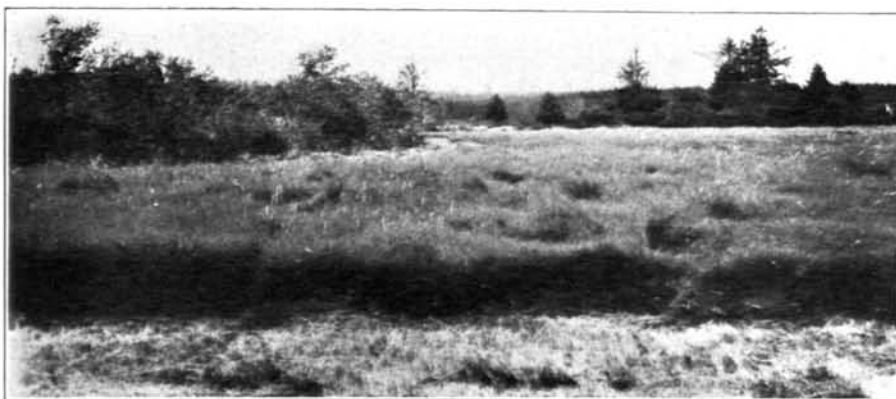


Bent Grass Seed Production in the Pacific Northwest

By H. A. Schoth

United States Department of Agriculture

No literature on bent grass seed production in the Pacific Northwest is complete without reference being made to the late Dr. C. V. Piper. Dr. Piper, for many years intimately associated with plant life in the Pacific Northwest, identified many of the bent grasses growing in this territory and on numerous occasions expressed the belief that some day it would become a large seed-producing section. He used his influence whenever possible to create interest in bent seed producing possibilities. His predictions have been fully substantiated, and already more bent grass seed is being produced in this territory than in all the remainder of the United States.



A small field of bent grass ready to be cut for seed. In the Lower Columbia River district

The history of bent grass seed production in the Pacific Northwest began in 1923 with the determination by Roland McKee, of the Bureau of Plant Industry, United States Department of Agriculture, and the writer, that the dense, low-growing, sod-forming grass growing in the Coos Bay, Oregon, region, and known locally as Bermuda grass, was in reality creeping bent. As a result of this determination the foundation for the present Pacific Coast bent grass seed industry was laid.

Upon Mr. McKee's return to Washington, D. C., this information was transmitted to Lyman Carrier, at that time in the office of forage crops, Bureau of Plant Industry, United States Department of Agriculture. Mr. Carrier was very much interested, and during the early spring of 1924 made a trip in company with the writer to the Coos Bay region for the purpose of investigation and ascertaining the possibilities of future bent grass seed production. He was very much surprised to find such large areas of practically pure stands of bent grass. A few months later, during that same year, Mr. Carrier became actively interested in harvesting and preparing for market the first bent grass seed grown on the Pacific coast. The harvesting of bent grass was begun two years later in the lower Columbia River section, and new areas are developing with each succeeding year.

From that comparatively small beginning the industry has developed very rapidly and the territory now producing bent grass seed

extends from southwestern Oregon to the Canadian line, mostly west of the Cascade Mountains. The largest bent grass seed producing areas are the Coquille Valley, the lower Columbia River districts in Oregon, and the Puget Sound district in Washington. Smaller producing areas are at Reedsport and Gardiner near the mouth of the Umpqua River, at Cushman near the mouth of the Siuslaw River, in the vicinity of Yoncalla, in the Willamette Valley, near Klamath Falls in Oregon, and in various sections of western Washington chiefly in the vicinity of Chehalis and Raymond.

Practically all of the stands now being harvested for seed are natural and many of these have been in existence for many years. The only entirely artificially seeded fields of bent grass now being harvested for seed are in Klamath County, Oregon. These seedings consist of approximately 70 acres and produced their first seed crops in 1930.

For the most part the land on which these bent grasses are growing is moist, of very low elevation and quite often subject to overflow, being in many cases under almost tide-water conditions. The regions of highest elevation now producing bent grass seed commercially are in the vicinity of Yoncalla and Klamath Falls, Oreg. The elevation at Yoncalla is approximately 356 feet and that at Klamath Falls approximately 4,105 feet.

No effort has been made to determine definitely the acreage on which bent grass is now actually growing and which offers potential seed-producing possibilities in the Pacific Northwest, but it is estimated that there is a total of 20,000 acres in Oregon and Washington on which bent grass seed may some day be harvested if the demand requires it.

There are a number of varieties of bent grass producing seed in commercial quantities in the Pacific Northwest. In the Coos Bay, Umpqua, and Siuslaw regions in Oregon practically all the seed harvested is seaside creeping bent, *Agrostis palustris* (*A. maritima*). The seed harvested in the lower Columbia River district is, for the most part, *Agrostis capillaris* var. *Astoriana*. In the Puget Sound, Wash., district there is considerable variation in varieties according to different areas. For the most part the seed harvested there is either *Agrostis palustris* or *Agrostis capillaris*. In the Yoncalla, Oreg., district the particular bent grass is another variety of *Agrostis capillaris*, locally known as Oregon bent. In the Klamath Falls district where the stands are now being harvested for seed the variety is *Agrostis capillaris* var. *Astoriana*. In the Willamette Valley there is considerable variation as to type and the predominating variety is common colonial bent, *Agrostis capillaris*.

Practically all of the natural stands in the Pacific Northwest contain some mixture. The Coos Bay and lower Columbia River sections are practically free from mixtures and are recognized as the purest stands of their particular varieties.

The harvesting of bent grass seed in the Pacific Northwest is a very interesting procedure. The crop is usually mature enough to harvest about July 20 and is ready to cut when heads rubbed rather briskly in the hand produce well-colored, plump, practically mature seed. Bent grass does not shatter easily under ordinary conditions. However, if it is cut too ripe or handled excessively after dry there may be some shattering.

The grass is cut with ordinary mowing machines and allowed to remain in the swath until dry enough to shock. Comparatively small shocks are usually made so that the material will dry out rapidly. Sometimes the crop is windrowed with a side-delivery rake and threshed from the windrow. As soon as dry enough to thresh it is hauled in tight-bottom racks to stationary threshing machines of the grain-threshing type and the seed is separated from the straw. About 30 acres were combined* in 1930 by the windrow method. This was the first time bent grass has been harvested in the Pacific Northwest by this method.

In order to secure the maximum amount of seed the material to be threshed must be dry. When damp the seed is difficult to separate and a large amount is lost. It has been the practice in a few instances to rethresh straw stacks after they have stood for some time. In a few cases this has been quite profitable while in others the amount of seed secured did not pay expenses.



Threshing bent seed in Coos County, Oreg. Here a 3-machine threshing outfit is in operation in a field of about 100 acres

The mechanism of the threshing machine must be thoroughly understood and adjusted so that the machine will do good threshing work, save practically all of the seed, and allow as small amount of trash, leaves, and straw to get into the sack as possible. It is not advisable to thresh in such a way as to get only clean seed in the sack because this practically always means a large blow-over of good seed.

The hand-harvesting of heads with sickles or shears is another method of harvesting which has been practiced in some sections during the past two years. Threshing with an ordinary thresher follows. This method of harvesting is usually practiced where only small areas are available and where the contour of the land is such that machinery can not be satisfactorily used. It is also practiced in some cases to eliminate possible mixtures or where the material has to be transferred for considerable distances for threshing.

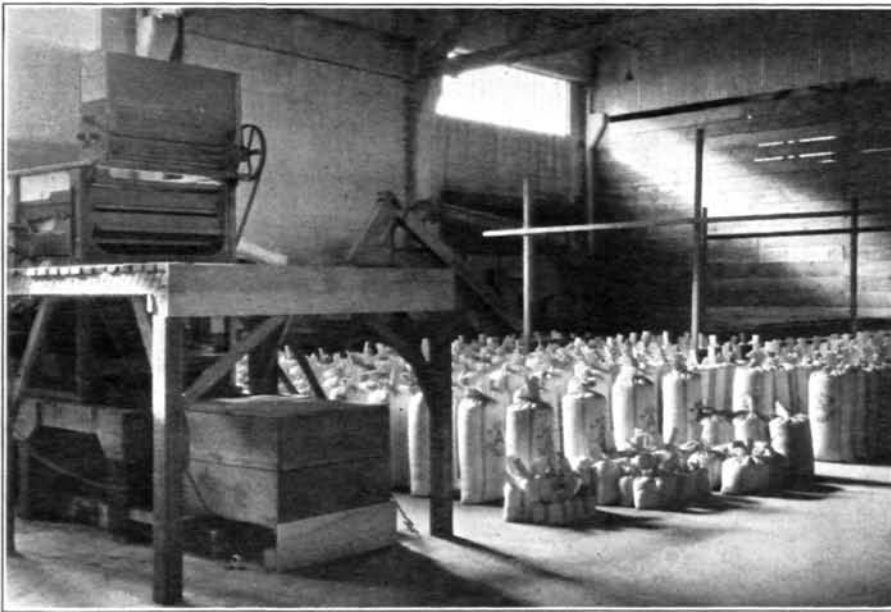
During the first few years of bent grass seed harvesting activity, the few persons interested in it purchased the bent grass hay from the growers after it had been cut at the seed maturity stage and shocked and dried ready for threshing. The hay purchaser did all the threshing, kept the seed, and returned the straw to the grower. For the privilege of threshing and retaining the seed the purchaser paid the grower from \$12 to \$20 a ton for the hay before threshing,

* A combine is a machine which is capable of harvesting and threshing in a single operation. Harvesting by the windrow method however requires two operations: the first is the mowing and windrowing, and the second is the operation of picking the heads and straw from the windrow and threshing it.—EDITORS.

and the seller retained the straw. This straw is fed to live stock and is considered practically the equal of unthreshed bent-grass hay.

During recent years the number of individual bent grass seed harvesters and threshers has increased considerably and the purchasing of hay for threshing has decreased in proportion. It is probable that some growers have too heavy an investment in equipment for the acreage they handle.

Threshing is done in the field whenever possible. During seasons when the harvest may be late or weather conditions moist, the hay is sometimes stacked, usually under cover. Where this procedure is followed the threshing season is extended considerably, and during some seasons threshing in barns continues well into the winter. The efficiency of threshing machine operation determines to a very large extent the amount and quality of seed secured.



Bent seed warehouse in the Pacific Northwest, showing the cleaning machinery

Yields of seed vary considerably. The hay from some fields produces such a small amount of seed that quite often threshing is discontinued after the results are ascertained. On the other hand, some rare fields have been reported as producing as high as 300 pounds of seed an acre. Average seed yields from all fields in all bent grass seed producing sections of the Pacific Northwest is probably between 50 and 75 pounds an acre. The seed yields vary greatly with seasonal conditions. Late overflows on low lands have a tendency to increase vegetative growth very materially and quite often reduce seed production. Abnormally dry seasons on the higher lands may reduce seed yields considerably. Rainy harvest periods sometimes result in considerable crop loss. During some years insect injury is also prevalent and the production of seed is reduced to the point where harvesting may not be profitable. Cutworms are considered the worst insect enemy.

During the early days of bent grass seed production the cleaning of the seed was done in commercial warehouses for the most part. As the number of individual producers increased, farm-cleaning plants were built and operated by many growers.

The quality of the cleaned product, while to some extent gauged by the type of cleaner used, is for the most part determined by the operation and the operator of these machines. Very high-quality seed is being produced by all types of cleaners now in operation. Cleaning bent grass seed is a rather difficult operation and very slow. The material as it comes from the threshing machine usually contains a high percentage of chaff, leaves, stems, and other foreign material. In some sections and on some fields where foreign plant seed is produced quite heavily and threshed with the bent grass, considerable difficulty is experienced at times in making a separation of such foreign seed from the bent grass seed. It is practically always necessary to run the seed through the cleaner 4 to 6 times, and some goes through 14 or 15 times in order to get at least a portion of the product of the necessary quality for high market standards.

Inspection of bent grass seed fields in the Pacific Northwest began in Coos County, Oreg., in 1925. The first seed was certified in Astoria, Oreg., in 1926, by members of the Oregon State Agricultural College. It is optional with the grower and dealer as to whether or not the seed is certified. The majority of the seed produced in Oregon is now subject to certification. Seed to be of certified quality must come up to certain field and finished seed standards as established by the Oregon State Agricultural College. The certification methods and standards are as follows.

Upon application by the interested party, fields are visited and examined after they are completely headed out. The examination is an extended one and a careful check is made as to the presence of any other kinds of bent grass or redtop. Each lot of seed is required to be kept separate until after it has been finally inspected. When harvesting and cleaning are completed the inspector uses a compartment grain tryer for sampling each 100-pound or 50-pound bag of seed offered for certification; or in the event of bulk lots, numerous samples are taken with the tryer and if the lot passes it is sacked in the presence of the inspector. Examinations with the eye and a high-powered microscope are made to be sure that the seed is strictly of the origin claimed for it. All lots that are passed for certification are immediately sealed and tagged so that there is no possibility for adulteration previous to the sealing process. Each tag is numbered and a record is kept for each tag that is issued, the lot from which it came, and the weight of the bag.

Standards have been established based on experience in the handling of the seed. In general terms, the seed must be very free from other bent grasses or redtop and from other foreign seeds, and must not have so much inert matter or chaffy material as to make it light in weight or present a bad appearance. No fields are passed for certified bent if they contain more than $\frac{1}{2}$ per cent of other kinds of bent grass, and the same standards apply to the threshed seed. While it is not possible to make exact analyses of all of the lots, no lot is passed if in the judgment of the inspector it contains more than 1 per cent of weed seeds. While a definite standard on weight per bushel has not been set, no lots have been passed weighing less than

30 pounds to the bushel, and practically all will test 34 or more pounds to the bushel. Every precaution is taken to assure the customer that he is getting a good grade of very pure, clean, live seed. Most of the seed has less than $\frac{1}{4}$ of 1 per cent of foreign seed.

Bent grass seed certification work has been carried on to a small extent in the State of Washington. No concerted effort has been made, however, in that state, such as has been made in Oregon, and as yet a comparatively small amount of the seed in that state is placed upon the market as certified seed.

The marketing of Pacific Northwest grown bent grass seed of the various varieties is undergoing constantly increasing expansion. During the early years of seed production the marketing was for the most part done by Lyman Carrier, either directly from his warehouse or through various seed firms in different sections of the country. During the past four years, with the increased production, there has been an increased number of marketing agencies distributing either in wholesale or retail lots or in both. At present there are no growers' cooperative organizations marketing the bent grass seed.

The future outlook of the bent grass seed production business in the Pacific Northwest is encouraging. There is still considerable acreage of natural stands that can be harvested and probably will be as the market expands. The most accessible acreage is now being harvested. As the harvested acreage increases it will naturally result in the more inaccessible areas being harvested, and there will probably be more hand-harvesting done than heretofore if prices are maintained.

On the present price basis there are great possibilities for the production of bent grass under cultivation in Oregon and Washington. In many of the lower-lying sections along the Pacific coast large acreages can be prepared and seeded to the variety of bent grass adapted to the particular locality. Some of this work is now being done in the lower Columbia River district, and it is expected that the seed from the planted areas will be harvested in 1931. The Klamath Falls area in Klamath County, Oreg., represents large possibilities in this connection. Climatic and soil conditions there seem to be very well adapted to the production of bent grass seed. If the market demand warrants there will no doubt be an increased acreage seeded in the near future in that section.

There are several areas in western Washington that offer possibilities for seed production under cultivation. That the bent grass industry has expanded very rapidly and has already assumed major proportions is indicated by the increase in tonnage from approximately 5 tons in 1924 to 125 tons in 1930. The recent increase in tariff is expected to stimulate the production of bent grass seed in the Pacific Northwest territory. That whole territory, especially along the coastal area, is naturally adapted to the growth of various varieties of bent grass, and the indications are that as the market demands expand production will increase in proportion.

The greenkeeper who gets the most done and still seems to have the most time on his hands for other things is the one who goes at his work methodically. Time used in mapping out your campaign in advance is time well spent.