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TURF SEED OF HIGHER QUALITY

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In purchasing any commodity a buyer must have some knowledge of the quality available if he is to make an intelligent choice. This is as important in buying seed as in buying anything else. Like other industries, the seed industry has made many improvements in recent years. Because of the introduction of improved growing, cleaning, and handling methods there are now available quantities of seed of a higher quality than was possible in the past. The improvements in turf grass seed have been in the preparation of the seed for sale, rather than in the introduction of improved varieties or strains. The plants that develop from the recleaned seed will not be superior to those from poorly cleaned seed, but there will be more of them and fewer weeds for each pound of seed sown.

BASIS OF QUALITY

Quality of seed depends primarily upon three factors, purity, germination, and the presence of weed seed. The purity of the sample is expressed as the percentage by weight of pure seed of the kind designated. The germination is expressed in terms of the percentage of pure seed that will grow. The germina-

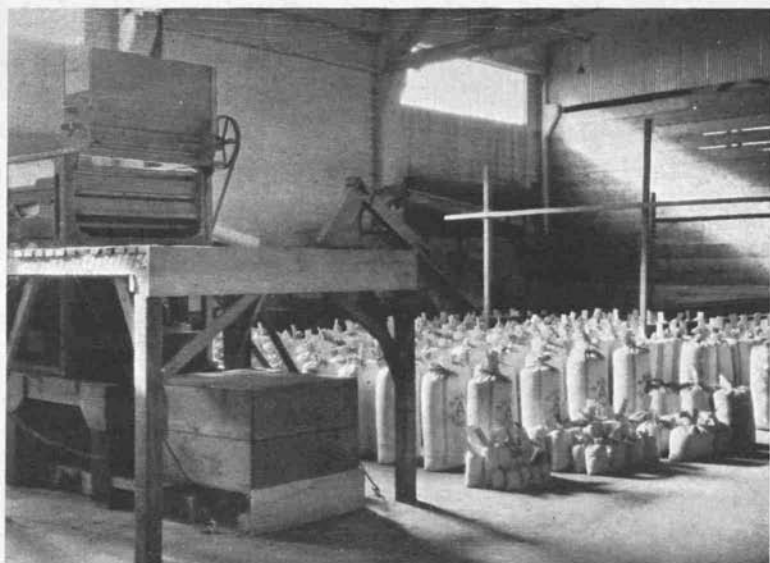
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tion times the purity, expressed as decimals, gives the percentage of pure live seed or the real value. Thus one lot of seed with a purity of 90 percent and a germination of 85 percent contains 76.5 percent pure live seed. Another lot with a purity of 95.6 percent and a germination of 80 percent also contains 76.5 percent pure live seed. If there is no difference in weed seed content, these two lots are for all practical purposes of equal value and should bring the same price.

Since under ordinary conditions the seed buyer is not interested in either the purity or the germination, as such, but in the amount of pure seed that will grow, he should compare values on the basis of percentage of pure live seed. To compare the actual value of two lots of seed at different prices the buyer need only determine the pure live seed content of each, as discussed above, and divide this figure into the cost per pound. The resulting figure will be the actual cost of a pound of pure live seed.

The impurities in seed may be chaff, foreign seed, even though more expensive, and weed seed. Ten percent chaff is merely so much waste; ten percent weed seed is quite a different matter. This is especially true where heavy seedings are made. Thus if the impurities are merely inert material, seed with a low purity may be a more economical purchase than re-cleaned seed. However, to be of comparable quality with respect to weed seed the impure sample must show a lower percentage of weed seed than the purer sample, for the increased seeding rate necessary with impure seed would naturally increase the number of weed seed deposited on a given area.

In order to supply seed buyers with up-to-date standards for comparison, a study of the records of the seed-testing



Modern seed cleaning machinery used for grass seed. In recent years there has been a decided improvement in the quality of grass seed available on the market. This is due largely to improvements in methods of cleaning rather than to the development of seed of improved strain. On the left is shown the equipment used for cleaning bent seed. On the right are sealed and tagged bags of inspected seed ready for the market.

laboratory of the United States Department of Agriculture was undertaken and several large and reputable dealers in grass seeds were consulted.

The results of this inquiry are included in the following discussion of the various kinds of seed commonly used for turf. The table on page 137 gives the minimum percentages of purity, germination and pure live seed; and the maximum percentage of weed seed which may now be expected in high quality seed of the more important turf grasses. These standards were set high enough so that only the best seed available in quantity would qualify. For seed of such quality the dealer will ask

a somewhat higher price to compensate for the extra cleaning and for the seed lost in this extra cleaning. The discriminating buyer will pay this difference if he wants the best.

In the table it will be seen that the quality possible depends on the kind of seed. For instance, the buyer may expect a high pure live seed content in ryegrass of even medium quality. This figure may be considerably higher than is possible in the best red fescue. This is brought about by differences in the germination of the fresh seed, in the difficulty in cleaning the seed, and in the length of time the seed will remain alive under various storage conditions.

It must be borne in mind that the standards suggested are for the average season. If the season is particularly wet or if there is a drought in the producing areas at harvest time the quality of the seed will suffer, especially in germination. After particularly favorable growing conditions these standards might well be a trifle higher.

Under the discussion of each of the grasses is given the pure live seed content to be expected in high or top quality seed. A second figure, representing good or above average seed, is given in each instance to show the range of material available. In many cases a grade somewhat under the highest quality may be the best buy. The buyer may determine this by comparing various lots on the basis of cost of a pound of pure live seed, keeping in mind any differences in weed seed content.

Kentucky Bluegrass

The large producing area for Kentucky bluegrass is in the Middle West, extending northward from the southern borders of Missouri and Kansas. Kentucky produces about one-sixth as much seed as this western area, and various other states pro-

duce smaller amounts. Selections of superior types for turf have been made but no commercial supply of seed of these is as yet available.

Buckhorn plantain (*Plantago lanceolata*) and yellow dock (*Rumex crispus*) are objectionable weeds sometimes found in Kentucky bluegrass seed. Sometimes Canada bluegrass has been used as an adulterant. Its presence is an indication of intentional adulteration as the two grasses do not seed at the same time, and hence could not be found in seed harvested at a single time. Kentucky bluegrass with a pure live seed content of 86 percent is of high quality, while a 75 percent pure live seed content is good.

Trivialis Bluegrass

Most of our *Poa trivialis* has been imported from the Scandinavian countries. Because of war conditions, however, importation of this seed has been cut off temporarily, so it will probably not continue to be available. *Poa trivialis* with a pure live seed content of 86 percent is considered high quality, and 75 percent is good.

Redtop

Over 90 percent of the redtop used in this country is produced in southern Illinois. Buckhorn plantain, ox-eye daisy (*Chrysanthemum leucanthemum*) and yarrow (*Achillea millefolium*) are often found in redtop seed. High grade redtop should contain 90 percent pure live seed. Redtop containing 85 percent pure live seed is of good quality.

Colonial Bent

The mixed bent which was used so much in former years was imported from Europe and was made up largely of Colonial

bent, with some velvet and a trace of creeping bent. Colonial bent is now generally seeded in pure stands for putting green purposes and large quantities are used in lawn and fairway



Certification of seed. Some of the grass seed on the market is now certified by state agricultural authorities. For several years members of the staff of the Oregon State Agricultural Experiment Station have been certifying bent seed grown in that state. For this certification, the fields are inspected before harvest. After threshing, the seed is brought into the warehouses for further inspection. Open bags such as those in the two rows on the right are brought in from designated fields. Samples are taken from the bags by a sampler like the one shown leaning against the post in the center of the picture. The samples are laid out on a table for examination. After examination and certification, the bags are tagged and sealed.

mixtures. Most of the Colonial bent seed now on the market is produced in the Pacific Northwest. Some seed is also produced in Rhode Island, New Zealand, and Canada. The Oregon-grown Colonial bent must meet the same standards for certification as are described for creeping bent. The purchase of

Oregon blue tag quality in the original sealed bags will assure good quality seed. Seed with a purity of 99 percent, a germination of 91 percent, and not over 0.2 percent weed seed is available.

Creeping Bent

Most of the creeping bent seed on the market is grown in Oregon and Washington. This creeping bent, called seaside bent, and sometimes Coos County bent or other names, produces plants that vary in their adaptability to lawn and putting green conditions. A considerable number of selections of good types of creeping bent have been made and some of these selections, such as Washington and Metropolitan bent, are now widely used. These selections do not come true from seed, so all plantings of improved types must be made with stolons.

Seaside creeping bent seed of very high quality is now being produced in the Pacific Northwest. Much of it is obtained by a combination of weed prevention in the fields and careful cleaning and handling of the seed. In Oregon, state officials inspect and certify the best grades of seed before they are marketed. The buyer of Oregon seed, therefore, who gets his seed in the original sealed bags is assured of seed of good quality.

If a bag of bent seed from Oregon is to carry the blue tag, indicating the highest grade certified, it must not contain more than 0.3 percent of other strains of bent grass, not more than 0.25 percent of total weeds, must have a minimum purity of 98 percent and a minimum germination of 85 percent. Considerable quantities of bent seed may be had which exceed these standards, some seed even showing an official count of 0.00 percent weeds. Blue tag seed should satisfy most needs, but considerable amounts of seed are available which are 98

percent pure, have 92 percent germination, and less than 0.2 percent weeds. There seems to be little reason for accepting a lower grade of seed than Oregon blue tag for use in pure stands, for it has been estimated that about one-half of the creeping and Colonial bents used in this country last year met these requirements.

Velvet Bent

Most of the velvet bent seed is produced in Rhode Island and nearby states. Velvet bent does not seed heavily, and the price is correspondingly high. Seed of velvet bent is very light in weight and it is difficult to remove chaff from it without considerable loss of good seed. For this reason the purity of the velvet bent seed on the market is not so high as that of the creeping and Colonial bent seeds. Indications are that velvet bent seed containing 80 percent pure live seed is of high quality, and 70 percent pure live seed is above average.

Red Fescue

Most of our red fescue, with the exception of Chewings, is imported from Europe. Red fescue containing 81 percent pure live seed and not over 0.2 percent weed seed is of high quality. Good quality red fescue contains about 75 percent pure live seed.

Chewings Fescue

Large quantities of Chewings fescue, a variety of red fescue, are imported each year from New Zealand. Due to poor shipping and storage conditions, this imported fescue is subject to loss in germinating power, as described in the February, 1940, issue. American production has recently been started on the west coast, and the chances of getting high germination are

better with this seed than with imported seed. High grade Chewings fescue should test 99 percent pure and have a germination of 86 percent. Chewings fescue containing 70 percent pure live seed is above average. Chewings fescue seed deteriorates

MINIMUM PERCENTAGES OF PURITY, GERMINATION, AND PURE LIVE SEED AND MAXIMUM PERCENTAGES OF WEED SEED TO BE EXPECTED IN HIGH QUALITY SEED OF THE MORE IMPORTANT TURF GRASSES, TOGETHER WITH THE APPROXIMATE NUMBER OF SEEDS IN A POUND OF EACH.

	Minimum purity	Minimum germination	Minimum pure live seed content (purity x germination)	Maximum weed seed	Approximate number of pure seed in a pound
Kentucky bluegrass	98	88	86	0.3	2,250,000
Trivialis bluegrass	98	88	86	0.3	2,500,000
Redtop	99	91	90	0.5	5,000,000
Colonial bent	99	91	90	0.2	8,000,000
Creeping bent	98	92	90	0.2	6,000,000
Velvet bent	94	85	80	0.4	10,000,000
Chewings fescue	99	86	85	0.2	600,000
Red fescue	95	85	81	0.2	600,000
Bermuda grass	99	91	90	0.2	1,750,000
Italian ryegrass	99	95	94	0.2	225,000
Perennial ryegrass	99	93	92	0.4	300,000
Crested wheatgrass	98	92	90	0.3	330,000

rates more rapidly than that of any other turf grass under improper storage conditions, and its germination should be carefully watched.

Bermuda Grass

Bermuda grass sets seed well only in arid regions, so most of our seed comes from Arizona and adjacent areas of California and New Mexico. Small quantities are imported from

Australia. The principal source of seed occurs as a byproduct of alfalfa (*Medicago sativa*). In arid regions alfalfa fields badly infested with Bermuda grass are allowed to produce seed, and when the alfalfa is cut the Bermuda grass is harvested and threshed at the same time. The two kinds of seed are separated in the threshing. High quality Bermuda grass seed should contain 90 percent pure live seed and good quality about 85 percent.

Ryegrass

Large quantities of Italian and perennial ryegrass are imported each year because of their extensive use as cover crops and in pasture work. American-grown ryegrass, 90 percent of which is grown in the Wilmette Valley, is of higher quality than the imported seed. Good Italian ryegrass should be over 99 percent pure, have 95 percent germination, and contain not over 0.2 percent weed seed. This is equivalent to 94 percent pure live seed. Perennial ryegrass apparently does not run quite so high in germinating capacity, so a pure live seed content of 92 percent may be considered high. Most of the Italian ryegrass on the market contains at least 90 percent pure live seed and 87 percent pure live seed is above average for perennial ryegrass.

Crested Wheatgrass

Crested wheatgrass is a cold and drought resistant grass of particular interest in the Northwest. It was used chiefly in pastures until the Fairway strain for lawns was developed. Some crested wheatgrass seed is produced in Oregon and Washington, but the bulk of it comes from Saskatchewan, Canada. High quality crested wheatgrass seed should contain at least 90 percent pure live seed and good quality about 85 percent.

WEED SEED CONTENT

Grass seed varies widely in its content of weed seed. Annual bluegrass and carpet grass nearly always carry a large quantity of weed seed, while most bent seed is either harvested with few weed seed or is well cleaned before it is marketed.

The kind of weed seed is more important to the turf culturist than the quantity. Many weeds, the seeds of which may be found in grass seed, need give the turf culturist little concern as the plants will not survive close mowing and the competition of good turf. Seeds of such weeds as lambsquarters (*Chenopodium album*) and pig-weed (*Amaranthus* sp.) may be present in grass seed but the plants will not survive the first season.

The labels required on seeds in most states must give the total weed seed content, the number and kind of seed of noxious weeds, and the quantity of "other crop seeds" present. These labels were designed primarily for the protection of the farmer, so the term "noxious weeds" refers to certain weeds which are particularly offensive on the farm in cultivated fields.

Some so-called noxious weeds are not dangerous in turf. Dodder (*Cuscuta* sp.), corncockle (*Agrostemma Githago*), horsenettle (*Solanum carolinense*), mustard (*Brassica* sp.), and others will not survive. On the other hand, such noxious weeds as plantains (*Plantago* sp.) and dandelions (*Taraxacum officinale*) may present serious problems in turf. Yarrow, not listed among noxious weeds in most states, may be very bad in turf.

Some crop seeds may be more undesirable than many weed seeds, including those designated as noxious in seed analyses. Seeds of certain grasses of value for hay may be most undesirable in turf seed. For example, timothy (*Pbleum pratense*) seed is sometimes found in Kentucky bluegrass seed, but when

this is used for some turf purposes the timothy may be more of a pest than many noxious weeds.

The quantities of weed seed allowable will depend on the use made of the grass seed. On putting greens only the very best



Sample of turf showing the abundance of weeds in a new area seeded with Colonial bent seed containing 0.1 percent hawkweed seed. The seed was sown at the rate of 3 pounds to 1,000 square feet. The distance between the hawkweed plants can be estimated from the fact that the plants themselves measured 3 to 4 inches in diameter. No plants of this weed appeared in the adjoining plots of turf where other seed had been used.

of grass seed should be used. Bent grass seed contains about 8 million seeds to the pound. Seeded at 3 pounds to 1,000 square feet, 24 thousand seeds will be placed on every square foot. If this seed contains only one-tenth of 1 percent of

weed seed by weight and if these weed seeds are about the same size as bent seed, 24 weed seeds will have a chance to grow on every square foot. No exact statement is possible as to the weight of the weed seeds in bent grass but the illustration will serve to emphasize the point that one-tenth of 1 percent of weed seed is important in any lot of seed that is to be sown so heavily.

It is not possible for a buyer to judge the pure live seed content by casual examination, but the present state and federal labeling laws make it possible for him to avoid impure or poor seed. It is still possible that a sample with a high pure live seed content may contain undesirable weed seeds. The Federal Seed Act, which is reviewed in the February, 1940 issue, does not prohibit the sale of seed containing weed seeds. It provides that the total weed seed content must be stated, but when heavy seedings are to be made the kind of weed seed present may be of great importance. Where weeds may be particularly important it probably will be well worth while to have a special analysis of the seed made to determine the content of harmful turf weeds.

On many lawn, fairway, and park areas the weed content is less serious, chiefly because the soil nearly everywhere is filled with weed seeds and when such a turf is first laid down many weeds must be expected. The number that may be added by seeding a good grade of grass seed will not materially affect the situation. While weed seeds are of course undesirable, there seems to be no reason for undue alarm if a few weed seeds are present in the grass seed used in such places.
