In the Pittsburgh and Chicago districts *Poa annua* seems to be more popular than elsewhere, and men experienced in course maintenance in these two districts believe that topdressing and watering are the principal factors in its long continued growth, being of the opinion that at least in their districts hot weather is not necessarily fatal to success with this grass.

In St. Louis it is generally regarded as undesirable. It disappears early in the season and its place is soon taken by crab grass and other undesirable grasses and weeds. It is reported that in this district sulfate of ammonia has been of value in lessening the quantity of *Poa annua* found in putting greens. In some cases fairways have been plowed up in order to eliminate it.

The experience of Mr. Spencer M. Duty, the Green Committee Chairman of the Canterbury Golf Club, Cleveland, Ohio, is in many respects the most instructive we have heard of, for the reason that his club has greens of three kinds, seeded greens and vegetatively planted bent greens of both unsatisfactory and satisfactory strains. In the first two cases his experience has been that *Poa annua* was a blessing, but in the case of his finest turf he has very wisely decided that *Poa annua* shall be eliminated as soon as it appears.

In the South where *Poa annua* grows throughout the winter months, and in some sections from early fall to late spring, the problem is entirely different from that of the northern courses. Where permanent greens are in use throughout the year *Poa annua*, or any other grass sown on the dormant Bermuda, has a decided tendency to retard the recovery of the Bermuda grass in the following spring. Where temporary greens for winter play are in use *Poa annua* can not be regarded as injurious, for it reinforces the yearly seeding of northern turf grasses and makes possible the heavy topdressing of the regular Bermuda greens, which prevents such serious competition of *Poa annua* with the Bermuda turf.

Improving Turf on Sandy Soil

By H. Kendall Read, Chairman, Green Committee, Country Club of Atlantic City

There must be a number of old courses in this temperate latitude where the soil is of a distinctly light or sandy texture and where the problem of fairway turf is of first importance. In most cases it is not practicable to throw the course out of use and attack the problem in a radical way. This would be the simple and direct method.

It has been proved beyond doubt that the most satisfactory turf, including bluegrass and bent, can be produced on old fairways of sandy subsoil. It has been done at Pine Valley and the Country Club of Atlantic City and other places. But you will not succeed until you bring about the necessary change in the texture and quality of the topsoil which actually forms the seed bed. You can grow fescue on loose, sandy soil, but I do not believe that you will ever produce a first-class fairway of closely knit turf from this grass. Many clubs have spent a lot of money trying to do this, but I think it is a hopeless job.

I never saw a really first-class fairway in the North that did not contain bluegrass or bent or both in substantial proportion, but neither bluegrass nor bent will grow satisfactorily on loose, friable soil. You are therefore faced with the problem of introducing a binder that will stiffen up the topsoil and bring about a condition

that will be friendly to these grasses. Until you do this, I believe that anything else is largely a waste of time and money.

At our club we have used mushroom soil practically alone on certain areas and have produced quite good turf. This soil contains a small proportion of clay (some more than others), and this, together with its food values, makes it useful. But if your soil is very sandy it would take entirely too much time and labor to produce results from mushroom soil alone. The proper use of clay seems to solve the problem. It would not be possible to lay down any standard practice to cover this use of clay because the conditions are too variable. Sandy soils differ widely and hardly any two clay soils are of the same character. However, I believe that our experience at Atlantic City during the last few years has taught us some things that should be helpful to others.

The soil on the fairways that constituted our principal problem was very sandy with more or less gravel in spots. The only grasses were red and sheep's fescue, which positively refused to knit. The top soil was so light and loose that the shoes of players and the wheels of the mowers left their marks. We simply could not throw these fairways out of play, plow them up and introduce the necessary amount of clay and humus to produce the turf we wanted. I finally located near Philadelphia, Pennsylvania, a very heavy, almost pure clay soil, which seemed to be suited to our purpose. We bought a number of carloads and started our topdressing. This was in the fall, and we used nothing else but the clay. We put it on rather generously—I think a little too thick—chain-harrowed it until thoroughly distributed, seeded bluegrass and redtop four to one — 75 pounds to the acre—and then rolled.

Before this bluegrass could not be found anywhere on these areas, and a number of my friends from the Green Section in Washington helped in the search. There was none. The next season we were much encouraged to find bluegrass making its appearance practically over all the area that had been topdressed. The following fall we gave a light topdressing of mushroom soil and seeded as before. We did not use more clay because it was still in evidence and our dose the previous season was liberal. The clay brought about a remarkable improvement in the mechanical condition of the topsoil. Instead of a soft, shifting sandy top, we had a firm and more permanent topsoil. I think that this mechanical condition is especially important in starting bluegrass and bent.

After our treatment the second year with mushroom soil, the improvement the following season was very marked, and we knew we were out of the woods and on the right road. Bluegrass was now coming up all over and it was only a matter of encouraging it to spread. As a result of the experience outlined above and on others of our 27 fairways, I have formed certain opinions on this troublesome problem:

1. Clay is the basis of the solution.

2. The kind of clay soil that is best depends upon your local conditions.

3. It is better to get soil that is too stiff than too thin, because you can lighten it yourself either with humus (an excellent idea) or by mixing it with your own local soil or with sand.

4. Do not apply the clay too thick. It makes an unpleasant condition in wet weather and takes too long to work in.

5. I believe that better results will be obtained if a little humus, like mushroom soil, is worked in when you first apply the clay.

6. It would probably be helpful to use a little bent with your bluegrass and redtop.

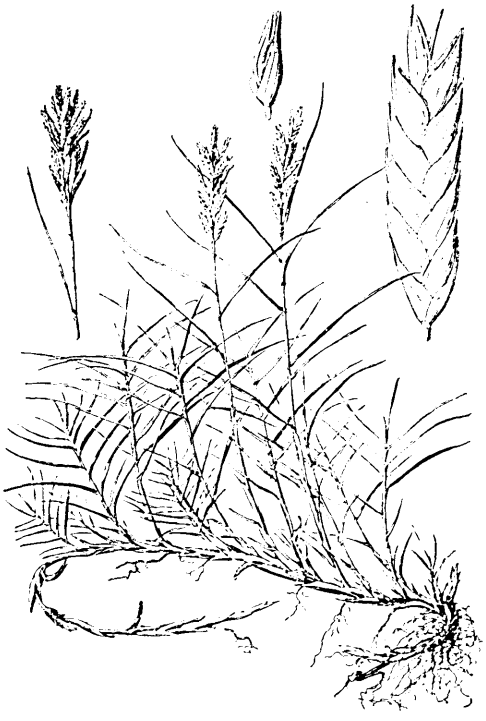
7. When you get the grass started, a light topdressing containing a small amount of clay, together with some humus, applied every couple of years, will encourage spread and continued improvement.

8. Water is always essential to good turf, but is of vital importance with sandy soils. If a reasonable supply can be provided, your results will be much quicker and surer.

Salt Grass

By H. L. Westover

Salt grass (*Distichlis spicata*) is of world-wide distribution and its presence is always indicative of an excess of soluble salts in the soil. It occurs in wet, salty areas along the seacoast and also in considerable abundance on alkaline soils of the West where moisture from seepage or from other sources is abundant. Its maximum tolerance is very high, yet at the same time it will grow luxuriantly where the salt content is too low for other saline plants. Salt grass resembles Bermuda grass in appearance and is often mistaken for it, especially before the seed heads develop. However, the seed heads of the two grasses are so distinctive that there is no reason for confusion once they have appeared. Salt grass may have a sphere of usefulness on some of the golf courses along the coast where salty water collects or on some of the alkaline soils of the West. It has an abundance of underground creeping stolons and it is only necessary to take up sod of the grass, chop it up and scatter the chopped stolons on the ground and roll them in or cover lightly. It should make a splendid turf where there is an excess of soluble salts in the soil even though covered with salt water a portion of the time, as, for instance, at high tide. Seed and material for vegetative plantings are not commercially available, but courses having conditions that favor this grass will ordinarily have little difficulty in locating areas near by where it occurs in abundance.



Salt Grass, Distichlis spicata. Staminate plant and a pistillate panicle, x ¼: pistillate spikelet and floret, x 2½