What Kind of Turf?

By O. J. NOER

WHEN grass is weed infested or grows badly, the first thing most people think about is fertilizer. They take a sample for analysis. They may be right in seeking a soil test for the feeding of grass is an important factor in turf maintenance.

But, fertilizer doesn't really work unless other factors are favorable for growth. The important thing to do is to make all other conditions favorable first and then solve the problem of feeding. When all other factors are favorable, fertilizer really functions, and that means a thorough understanding of all the fundamentals upon which turf growth depends. After all, I don't see how anybody can intelligently manage turf unless he knows those factors. But with that knowledge, he can diagnose trouble and formulate a program which will correct the cause and produce a dense sward of weed-free grass.

First Comes Diagnosis

The physician first explores all symptoms before diagnosing the cause of illness. He knows that high temperature indicates infection, but that temperature doesn't tell whether it is a typhoid fever, a bad appendix, or something else. Some other more specific symptom tells him what is the real cause. The procedure is more or less the same with turf. First it is necessary to diagnose the cause, and then it is possible to prescribe a treatment which will give good grass. As a rule, after finding the cause it is comparatively easy to decide upon an effective improvement program. Very often, the answer is to be found right on the property, so in surveying the situation it is important to keep that fact in mind.

Some years ago a club in Canada, between Ottawa and Montreal, had mostly clover, plantain and other weeds in its fairways. Each year much fertilizer and fescue seed were used, but the seed never developed into turf. There was an unsuspected drainage problem before anything else. The course was built on a rocky hillside where seepage broke out along hillside, in spring and fall. Fescue cannot stand wet feet, so the new seedlings were killed every year. It was impossible to install an adequate tile drainage system because of outcropping fissures in the rock. As a consequence, the club was compelled to use bent grass which, after all, is a water grass. After doing that, the fertilizer worked and developed turf, which conquered the clover and other weeds. Instead of sowing seed, they planted stolons of native bents found growing wild along the banks of nearby streams.

In considering turf, the underlying fundamentals include: (1) favorable environment; (2) grasses which are suited to the locality; (3) a fertile soil; (4) a sensible maintenance program; and (5) absence of unfavorable conditions. This is a negative rather than a positive factor.

From the standpoint of environment, climate comes first. Many of you know that corn does its best down in Iowa and Illinois. Yields per acre in those states surpass Wisconsin because the nights as well as the days are hot and humid. That is when corn really grows. Northern Wisconsin produces better potatoes than the region farther south because potatoes prefer a cool moist climate, with plentiful rainfall when tubers begin to form. Northern Wisconsin is almost always able to produce higher yields than farther south where the climatic conditions are against maximum growth.

Most Like It Cool

Most of our permanent grasses—north of the Ohio River—prefer cool climate. That is why they grow best in the spring and fall. Grass is one of the few plants that is vegetative in the fall as well as spring. After hot weather is over, grass starts to grow again and continues growth until the winter begins. Most other plants go through a regular cycle: germination, a vegetative stage, and finally reach maturity, when they produce seed for the succeeding season. This sequence is not true of lawn grass which is constantly clipped.

It is hardly necessary to mention the necessity or importance of moisture, for that is needed by all crops. Grass during a single growing season may use as much as 5,000 barrels of water per acre. Grass

roots are comparatively shallow; confined mostly to the surface 3 or 4 inches of soil, although a few extend deeper to 7, 8, and even 9 inches. Since the majority are confined to the surface soil layer, it means that moisture must be there too. That is why grass thrives in a moist cool climate and is probably the reason Britain grows so much better grass than continental America. Some say it takes 100 years to produce a good lawn. I doubt that. The British are no better grass men than we are; in fact, many of them probably are not as good because it is so much easier to grow grass there than here. The only sections in this country where climatic conditions resemble those of Britain are along the coastal regions of New England and the Puget Sound section of Washington and Oregon. I have seen very fine grass in both sections, and know it is much simpler to maintain good turf in both regions than in places like St. Louis or Cincinnati. Just go to Kansas City, to Washington, Philadelphia, or St. Louis during July and August and see what a tough time it is for the boys there to keep good turf. The main trouble, of course, is the intense hot weather during the summer months.

1,500 Grass Species

Obviously, a grass suited to the soil and climatic environment should be selected. There are more than 1,500 identified grasses in the United States. If any of you doubt that fact, send to the Superintendent of Documents, Government Printing Office, Washington, D. C. for Hitchcock's book on the "Grasses of the United States"; of the large number listed therein, choice for courses in the north simmers to less than a dozen..

I like to divide grasses into two broad groups: "permanent" grasses and the so-called "temporary" ones. In the north, the permanent grasses include the blue grasses —Kentucky blue and Canada blue—the fescues, the bents, and poa trivialis. That pretty well exhausts the list used for fine turf.

Canada bluegrass is not desirable for fine turf because it does not produce a tight, closely-knit sod under close mowing. It will grow on poor soil, but that is its chief virture. Some years ago a course in Ottawa installed a water system as a necessary step toward improving fairways. Their problem was really one of changing the type of grass too. Before fairways were watered, Canada bluegrass was the only grass which would survive on the poor sand, but it didn't make a tight enough turf. Therefore, it was necessary to re-seed with a more desirable grass, and since the water system could provide needed additional moisture, it was possible to change the character of the turf and provide better playing fairways.

Kentucky bluegrass is the most widely used lawn grass throughout the northern sections of the United States. In almost every region, excepting New England and a few other localized spots, volunteer Kentucky bluegrass takes over whenever cultivated land is allowed to revert to grassland. In New England, Kentucky bluegrass does not volunteer because soils there are too acid and too low in phosphorus. Kentucky bluegrass is a lime-loving plant and grows best where phosphorus is plentiful too. Both conditions exist in the so-called "Blue Grass Region" of Kentucky and Tennessee.

In New England the native grasses are largely the bents—creeping, colonial, and even velvet bent. They grow on the more acid soils there.

Few Fescues Suitable

Of the fescues, from the standpoint of fine turf—we generally think of Chewing's fescue first. It is a red fescue. The seed originates in New Zealand and is called Chewing's fescue because a man by the name of Chewing introduced the grass into that country. The seed from New Zealand is preferable to European red fescue because it is free from sheeps fescue, which is too bunchy and course for fine turf. There is some fescue seed being produced in this country, particularly under irrigation conditions in Oregon. Since fescue seed is comparatively large, much more seed is needed than when Kentucky bluegrass is used. So, if the price is high, seeding with fescue is especially expensive.

Originally the bent seed used in this country was the so-called "mixed" or "South German" bent, which was actually a mixture of different bents, as the name implies. There was 10 percent to 30 percent of velvet bent in the mixture, a variable amount of creeping bent along with some colonial bent. Since the creeping bent exhibits different characteristics both as to color and character of growth, an area seeded with mixed German bent looks like a patched quilt, due to localized spots of different grass. There are a few spots of velvet, and many others of different creeping bents, some quite coarse

and others which are fluffy. They vary in color from a yellow apple-green to a deep blue green.

Even before the war, importations practically ceased due to imposition of a 40 percent duty on mixed German bent seed. Hence, right after the last war American grown bent seed, produced principally in Oregon, Washington, and Rhode Island, displaced mixed German bent.

Excepting velvet, there are two general types of bent, so-called "seaside" and "colonial". Seaside is a creeping bent. That is the way all special strains, such as Washington, Metropolitan, etc. originated. A likely-looking piece of turf was taken up, stolons propagated in a row and then used to develop turf.

Colonial bent grass is presumably not stoloniferous and is more upright in growth habit. There are two principal sources of seed in this country, the so-called "Astoria", which is western grown, and the Rhode Island colonial, which is produced in limited amounts in the state of Rhode Island.

There is one other grass, the seed of which is not available at the present time because practically all comes from Denmark. Naturally, there is no seed coming from there now. The grass is poa trivialis, which is used in shaded places primarily. It does not grow well out in the open, although it looks fine in spring and fall, but during the hot weather poa trivialis thins out so badly that it appears to have disappeared completely, yet it comes back strong in the fall.

Bluegrass Makes Loose Turf

In choosing grass, one which will thrive and develop a thick sward under existing soil and climate conditions should be selected. Kentucky bluegrass is the chief constituent in practically every seed mixture in regions similar to Milwaukee. It does admirably out in the open if not cut too close. There are very few acid soils so there is no need to worry much about lime. Kentucky bluegrass doesn't make an extremely tight turf. When cut fairly close, it is somewhat open, consequently on fairways it is rather hard to control clover. In order to simplify clover control, some use a little bent too, in order to increase turf density and help keep clover out. A colonial bent, such as Astoria, is the better type to use on fairways with Kentucky bluegrass.

Fescue is admirable for sandy areas, for it withstands heat and drought, but it will not tolerate hot muggy weather. That is why it is not good in regions as St. Louis and Philadelphia. There heavy rains in humid weather play havoc with this grass. One objection to fescue is that it goes off color after mowing. Right after cutting tips turn brown and then the whole lawn appears brown.

Chewing's fescue is a very good grass for shaded areas, especially under trees where the tendency is for the soil to stay rather dry. It may go off color, but it usually will survive and comes back strong in the fall.

Poa for Shade

Poa trivialis has only one place in lawn maintenance and that is as a shade grass in damp, moist locations. In other words, in areas which are commonly called "sour". Such a soil may or may not be acid from a chemical standpoint. Sourness to the average man really means poor drainage. In such places poa trivialis is good. It usually grows better under those conditions than any other grass.

In discussing the "Temporary Grasses", we confine ourselves to only three: redtop, rye (domestic rye), and timothy.

These grasses should be considered more in the nature of nurse grasses for the slower growing permanent grasses. Every mixture probably should contain some redtop to give cover while the slower germinating fescue and bluegrass are developing. When using redtop, the percentage should not exceed 20 to 25 although very often mixtures may contain 40 to 50, primarily because the seed is considerable cheaper than Kentucky bluegrass. When buying redtop, the fancy grade should be used because of its higher purity. That reduces the possibility of introducing weeds, chickweed in particular.

Rye and timothy are found mostly in cheap seed mixtures. Many people think they are fine because the grass comes up quickly and covers rapidly. That to them is assurance that there is nothing wrong with the seed mixture, so when the timothy and rye go out and the weeds come in, they look elsewhere for the cause, instead of blaming poor, cheap seed which is the primary cause.

The question of rate of seeding is largely a matter of number of seeds per pound. In compounding a mixture containing only 20 per cent of redtop by weight and 80 per cent of bluegrass,

there are almost as many redtop seeds as bluegrass because of the sizes of seeds. Velvet bent has 8,000,000 to 12,000,000 seeds per pound; colonial bent about 6,000,000 seeds to the pound; seaside—4,000,000 to 5,000,000; Kentucky bluegrass approximately 2,250,000, and poa trivialis a trifle less. Chewing's fescue has only 500,000 seeds to the pound, or less than one-fourth as many as Kentucky bluegrass; redtop has around 5,000,000; rye grass 250,000; and timothy a little over 1,000,000. That is why seeding rates are varied. If there are too many seeds the tendency is for the crowded young seedling grass to smother. Rates for bent are as low as 1 to 2 pounds per 1,000 square feet. With colonial bent the tendency is to use from 2 to 3 pounds, and the same is true for seaside. With bluegrass anywhere from 3 to 5 pounds is used along with about 20 per cent of redtop. With poa trivialis, when used for lawn purposes, it is seeded at 3 to 5 pounds per 1,000 square feet. Chewing's fescue rates are heavy because the seed is large and germination sometimes slow. Ten pounds per 1,000 square feet is not considered excessive for lawns. With redtop, the rate is about 3 pounds per 1,000 square feet. Rye grass rates vary; the customary practice with some is to put rye in the seed mixture because it grows quickly and is supposed to help protect permanent grasses. I don't think there is a place for rye except on some slopes, and then the percentage should not be high because it will smother out some of the more desirable permanent grass, should it make a rank growth.

A Case of Smothering

One time when in Florida, a Palm Beach greenkeeper said that bluegrass was no good for seeding in greens. When asked why, he replied that it didn't come up. That wasn't sure proof that the seed wasn't viable. When seeded together, the rye seed comes up in 3 or 4 days, whereas it takes several weeks for the bluegrass to germinate. When 30 percent or less of the mixture is bluegrass, the rye comes up so fast that it smothers and shades the bluegrass, thus preventing germination and subsequent growth. After this explanation this man tried seeding the bluegrass first, waiting for it to emerge before sowing rye. By doing this he obtained a mixed stand of both grasses.

We should keep this fact in mind when compounding grass seed mixtures. If the mixture is too high in temporary seed, development of the permanent grasses, which are really wanted, is retarded.

Depth of seeding is important, but seldom appreciated. During one of the short courses at Madison, Professor Ahlgren presented data on experiments dealing with seeding depths. He showed, as might be suspected, that large seed, such as fescue, could be imbedded to a depth of one-half inch without seriously reducing percentage of emergence, but with small seed, such as bent, deep planting seriously reduced the stand.