

## DR. MARVIN FERGUSON HONORED

Dr. Marvin H. Ferguson, Mid-Continent Director and National Research Coordinator of the USGA Green Section, has been elected a Fellow in the American Association for the Advancement of Science. Membership in the Association honors meritorious contributions to science.

The aims of the AAAS are to: Further the work of scientists; facilitate cooperation among scientists; improve the effectiveness of science in the promotion of human welfare; and increase public understanding and appreciation of the importance and promise of the methods of science in human progress.

Dr. Ferguson, 46, lives in College Station, Texas, and in addition to his other USGA duties is Editor of the USGA GREEN SECTION RECORD.



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## Bentgrass for the South-Management

By **MARVIN H. FERGUSON**, Mid-Continent Director, National Research Coordinator, USGA Green Section

Whenever a species of plant is grown near the border of its area of natural adaptation, manipulation of the environment can become very important in determining success or failure. Thus it is with bentgrass in the South.

Little things, factors that would normally produce negligible effects, things like the direction of slope, the amount of air circulation, or the occurrence of a midafternoon thunderstorm, become matters of major importance as they influence the culture of bentgrass greens in the South. Mistakes here don't result in a simple situation like discolored grass and an embarrassed superintendent. They may result in the complete loss of turf and sometimes, unfortunately, in the loss of a superintendent's job. Inordinate care in routine maintenance practices is a requisite.

### MOWING

The mowing of bentgrass in a difficult area is not simply a routine operation. Plant physiologists have long known that damage to tissue causes an increase in temperature and respiration in the damaged area. Mowing creates injury. Careful mowing may create much less injury. The mower should be sharp and well adjusted. The height setting should be carefully checked at frequent intervals. Loose bushings should be replaced promptly, the clippings box should be emptied before the weight of clippings begin to affect the height of cut, and mud or other foreign matter should not be permitted to collect on rollers. Above all, the workman must be instructed to turn carefully. It is preferable to turn well out on the collar, but if the collar is bent, it may be damaged by a spin-

ning drive roller. It is better to disengage the clutch and turn with the power off. It's a much slower way, and the workmen will resist turning in this way, but it's the price of a bent collar in a difficult area.

In particularly hot, humid weather, when wilting is a problem, some superintendents like to mow in late afternoon or early evening. The grass appears to be damaged less when mowed late in the day and it has the cool hours of night time to recover from the injury and the bruising.

#### FERTILIZING

The use of fertilizers on bentgrass in hot weather is a touchy matter even in areas where bent is well adapted. Experienced superintendents fertilize greens very lightly in summer months and a great many of them use either organic sources of nitrogen or slowly available synthetic materials which are unlikely to produce burning of the turf. Experienced men pick a cool day or they wait to fertilize until late afternoon.

Usually about  $\frac{1}{2}$  pound of nitrogen per 1,000 square feet per month is the maximum during June, July, and August. In the South, May and September can also be very warm and humid. It is a good rule to apply most of the fertilizer to bentgrass during the cool spring and fall months and to fertilize very lightly in summer.

In some areas, superintendents add small amounts of soluble nitrogen carriers and sulfate of potash in the form of a liquid. Such applications are necessarily very small. They serve to keep the grass growing without allowing it to become lush.

#### WATERING

Watering is a practice worthy of much thought because it is the practice most frequently carried out incorrectly. It can cause serious trouble and it can

cause trouble quickly.

It is simple to state the correct procedure for irrigation. It is quite another thing to achieve proper irrigation in practice.

In theory, the soil should be moist enough throughout the root zone to supply the plant's needs for water. It must not be so moist that air is excluded from the larger pores. Soils either too wet or too dry will cause wilting of the turf. Irrigation then should simply restore the moisture that is removed from the soil by evaporation and transpiration.

The natural tendency of workmen is to overwater. It is easy to impress upon a man the fact that the plant roots need adequate water. It appears much more difficult to persuade him that too much water will exclude the air and result in wilting.

In irrigating bentgrass, it is important to apply water slowly enough so that it goes into the soil without runoff and to apply a sufficient amount to replace the moisture lost from the soil since it was last irrigated. The time required for a given sprinkler to restore the proper moisture content to a given green may be learned from experience. In gaining the experience, however, it is extremely important to use a probe to ascertain the moisture status of the soil.

In hot weather, bentgrass roots are usually rather short. Thus the critical area insofar as moisture is concerned may be no deeper than two inches. When plants are transpiring rapidly, it may be difficult to keep enough moisture in this shallow zone to adequately supply the plant. At such a time, it becomes necessary to depart from the "heavy but infrequent watering" theory and apply small amounts of moisture at frequent intervals. It may be necessary to shower greens several times a day

to help overcome the deficit of moisture in the leaves.

In showering greens, the workman who has not gained an understanding of his purpose may do more harm than good. If greens are adequately irrigated at night or in early morning, the soil is not likely to be seriously dry by mid-day. Grass needs moisture because the demand of rapid transpiration exceeds the supply gained through a limited root system. The purpose of showering then is to provide a little moisture to the leaf surface where the deficit exists. Showering cools the air in the grass leaf's micro-environment, it raises the humidity and the loss of moisture from the leaf surface is reduced sufficiently to allow the root system to catch up to the leaf's demands. The soil does not need water. It is usually wet enough. Therefore the person doing the showering should be instructed to "wet the turf but not the soil."

Now if the irrigator is overzealous and puts on too much water in the heat of the day, what happens? In hot weather soil and water will hold very little oxygen. When enough water is applied to fill all the pore spaces in the soil there is no room for air (oxygen). In the absence of oxygen cell walls become impermeable. The roots will not take up water even though water surrounds them. Transpiration occurs at the leaf surface, but the lower portions of the plant, though bathed in water, can supply none to the leaves. The leaves wilt and we say the turf was "scalded."

### DRAINAGE

The foregoing discussion is a good background for stressing the importance of good drainage. Drainage begins at the soil surface. As soon as water enters the soil we become concerned with its drainage. A compacted

or layered green which impedes water movement in the top three inches is poorly drained just as is one which suffers from a plugged tile line.

Drainage and aeration are inseparable because pores in the soil must be filled either with water or air. Ideally there should be an adequate supply of each. When water enters the soil, air is pushed out and when water drains out air is pulled into the soil.

One of the first requirements of bent in a difficult area is adequate drainage that cannot fail at a critical time.

### NO MISTAKES ALLOWED

Vertical mowing a bent green on a warm day in April has resulted in the loss of a green—and a job!

Fertilizer applied too heavily and watered in too late will sometimes cause loss of turf. An overdose of fungicide may start a green downhill.

The grower of bent should place a great deal of emphasis on planning. Get jobs like cultivating, topdressing, thatch removal, grain removal, herbicide applications, and patching done in cool weather when bent is growing well and can recover from any mistakes you or your workmen may make.

Begin your irrigation regime early to encourage as deep roots as possible going into the summer months. Plan fertilization so that grass can "harden off" a little before the advent of hot weather.

During hot weather, do as little to the greens as possible. Practice careful routine maintenance and move the flagstick as often as possible.

Keep a sharp lookout for diseases, insects, and localized dry spots.

Remember that in a borderline situation it frequently is a seemingly small thing that will tip the balance. Attention to these little things may be enough to tip the balance in your favor.