Care of Bent Grass Golf Greens

Climatic Zones, Soil and Drainage

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The turf on a well kept putting green is as near perfect as man can produce. Skill is needed to obtain and keep it that way. Success depends upon selecting a grass adapted to the local climate, of following maintenance practices which are suited to it and of being prepared for spells of bad weather.

Weather and Climate Affect Turf on Bent Greens: An understanding of the distinction between weather and climate, and of their effect upon turf is essential. Weather refers to the atmospheric condition at a particular moment with respect to heat or cold, humidity, wetness, drought, clearness or cloudiness, etc. Climate is the average condition of weather in a particular spot over a period of time, usually many years. It is the summation of day by day weather.

The geographical distribution of grasses is a matter of climate. The bent grasses grow best in regions of temperate climate and prefer moderately cool, moist weather. They can withstand considerable heat, provided humidity is low and especially where nights are cool. Bent greens fare badly in wet hot humid weather. Brown patch and scald are very bad during rainy spells when the nights as well as the days are hot and humid.

The coastal regions of New England, and the Pacific Northwest, are the best places for bent grasses on this continent. Rainfall is plentiful and temperatures are always moderate. Elsewhere bent grass greens are found in the area North of a line from Washington to St. Louis and Oklahoma. From Washington the line dips South to include all of West Virginia, the mountainous areas of the western part of Virginia and North Carolina, and the eastern parts of Kentucky and Tennessee. Then it passes roughly from Chattanooga to Knoxville, Cincinnati, Louisville, Evansville, St. Louis and on thru Springfield, Missouri to Oklahoma. Golf courses with bent greens are scattered throughout Oklahoma, North and West Texas, and the states of Arizona and New Mexico. Southern California has had good bent greens for many years. Daytime temperatures in the southwest are high in summer, but nights are cool. Humidity is low, and rainfall is negligible. Greens never become waterlogged from natural precipitation.

Temperate Climatic Zone Consists of Three Belts: The temperate zone of the United States and Canada can be subdivided into three belts; based upon the effect of climate and weather on bent grass. The southern belt reaches from Philadelphia and Washington to Kansas City and includes Cincinnati, Louisville and St. Louis. The northern belt extends from northern New England and Quebec to Minneapolis, Fargo and Winnipeg. The central belt embraces the region in between and is typified by New York, Boston, Buffalo, Cleveland, Detroit, Chicago and Denver.

Turf maintenance must be designed to fit the local climate. Difficulties multiply when the climate is not ideal, and become impossible when the region is wholly unsuited to the grass. The program must be designed to meet any variation from the normal, because day by day weather vitally affects maintenance. Difficulties arise during periods of unseasonable winter or summer weather. Selection of a suitable grass, fertilization, watering and disease control are the important factors which spell the difference between success and dismal failure.

Southern Belt: The climate is not ideal for northern or for southern grasses. The summers are too hot and humid for bent, and the winters are too cold for bermuda grass. It is the most trying and difficult region for bent greens. Maintenance is extremely difficult and hazardous during the hot humid period from June to September, when brown patch and scald are rampant. Dollar spot is rare in summer but is the principal disease in spring and fall. Winter-kill and snow mold are almost unknown.

Excellent drainage and a well ventilated soil are indispensable in this zone. Without them it is impossible to cope with adverse rainy weather. The need for good natural or artificial subsoil drainage is obvious, but ideal surface drainage is even more important. Surface run-off is the quickest way to remove surplus water during and immediately after heavy summer rains.

Northern Belt: Mild daytime weather and cool nights simplify maintenance during most of the growing season. Dollar spot is the principal disease, yet many clubs have not learned the secret of its prevention and control. Greens do not receive enough nitrogen to keep the grass healthy and in active growth. Fungicide is not used regularly to prevent, rather than cure, dollar spot. Brown patch and scald

are rare. Snow mold and other types of winter-kill are the chief menace. Badly damaged turf recovers slowly because spring weather is too cold for seed to germinate, or growth to start from the few nodes that survived.

Central Belt: This is an intermediate belt, a transition zone with moderate weather the rule in summer and in winter. Maintenance is a matter of being prepared for unfavorable periods. Troubles arise during occasional spells of hot humid weather in the summer, and an occasional bad winter.

Soil for Greens: Soil is not just so much dirt, but consists of solid, liquid and gaseous matter. It is half solid by volume with about 70 to 80 percent minerals which is a mixture of sand, silt and clay particles. The other 20 to 30 percent is organic matter or humus. The non-solid half, or the voids between the particles, is half water and half air. Stated another way, a cubic foot of soil should contain one half cubic foot of solid matter, one quarter cubic foot of water and one quarter cubic foot of air. Such a soil is well ventilated, and an ideal medium for the growth of grass, or any other crop.

The subsoil need not have organic matter, but it should be well ventilated to facilitate drainage, and speed the removal of surplus gravitational water. A system of tile drains should be installed in all greens having a subsoil which does not meet these specifications.

A putting green is more than a place to grow grass. The surface must have enough resilience to hold the ball of a pitched shot and yet be firm enough to have billiard table trueness. Over-watering is one way to make a green hold a pitched ball. The better way is to have a good soil structure. The surface will have sufficient resilience to hold the ball, irrespective of its moist content. Then it will not be necessary to resort to the bad practice of over-watering.

The surface soil on a putting green should be not less than 4 to 8 inches deep. A medium sandy loam containing 20 to 30 percent organic matter, but no more, is best. This soil has enough sand, with particles varying in size from coarse to fine, and has the right amount of silt and clay to impart the desirable qualities these colloidal substances possess. They give the soil body, enable it to retain and release available plant nutrients, and enhance the water holding capacity. Too much silt or clay makes for excessive compaction due to heavy traffic, the puddling effect of frequent watering, and the compressing effect caused by constant mowing. Compaction deprives the soil of air, and then the root system becomes shallow because feeder roots breathe. They must have oxygen to live, otherwise they perish.

The presence of some organic matter in the surface soil is essential to make it slightly resilient and perform other func-

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large this winter regardless of the absence of several name-players.

Eventually the sponsor troubles will be ironed out, probably by the sponsors refusing to put up prize money unless the players themselves can devise some method of assuring appearance of a fair number of the stars. How the stars and the aspirants or others who'll make up the fields will solve that problem is something that's now being soberly considered. They'll either solve it or have a shortage in the golden egg market.

Changes in Prospect

There is talk of prevailing on the stars to accept fines in case of non-appearance at PGA events. That probably won't get very far. It is almost a sure thing that the tournament schedule will be curtailed. Fall events that clash with collegiate football publicity are most likely to be skipped. The players themselves, since the Corcoran-Metz affair, are realizing that their business is playing golf and not holding meetings of a debating society. The tournament players have a tough problem in sports business but not one to be ashamed of or to fear as are problems in sports that gamblers have dirtied. As regrettable as the Metz-Corcoran outburst was it didn't have a public reaction that reflected adversely on any angle of tournament golf except the pardonable inability to keep strained nerves under control.

One of the exasperating situations with which the tournament players, the PGA tournament bureau and sponsors of events have to contend is that of invitation events. There was enough delicacy involved in invitation events when the Miami 4-ball, the Inverness invitation and the Goodall events were about the only fixtures of this sort but since invitation events have increased there are more problems of selecting fields and keeping calm and quiet those who are not invited.

Another factor that has to be kept under control while the tournament scheme is getting readjusted is loose lips. It did seem that they would get out of bounds following the clash at Carmel and Corcoran's suggestion to "forget it" undoubtedly halted further hot talk that would have done nothing to get tournament golf on a sound, serene business basis. The incident was an unfortunate element in tournament golf's growing pains, but nothing to split pro golf which has its greatest years ahead for the playing pros as well as for the fellows whose major—or sole—income is from their jobs at their clubs.

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tions connected with growth. It is the energy food for beneficial soil micro-organisms. As the organic matter undergoes decay by them carbonic acid is generated. It is the principal solvent in the soil solution and is responsible for the liberation of the mineral soil nutrients. Organic matter increases water-holding capacity and imparts other benefits of its colloidal nature.

Too much organic matter is bad from the standpoint of play and maintenance. When overdone greens become so soft that they foot mark badly. Humus or peat has a high water-boiling capacity and may retain 200 to over 300 percent of moisture. Both tend to resist wetting when dry. Greens with more than 30 percent by volume of organic matter become too wet during rainy weather, and dry-out too slowly

Depression on green holds snow and ice and invites snow mold and winter kill.

Casual water in depression may produce scald and other summertime troubles.

afterwards. Should they ever become a little too dry it is hard to get water back into them.

Mixing Soil for New Greens: The top-soil for a new green can be mixed on the green with a roto-tiller, or an agricultural disc. The best procedure is to mix the soil and sand first and then incorporate the peat or other organic material. In practice the soil is spread over the finished sub-grade and covered with the proper amount of sand. After they are well mixed the peat is spread and worked in. A good grade of reed or sedge peat should be used. Thorough mixing of thick layers is impossible. The best way is to spread and mix half the amount and then the other half. There is a trick to obtaining a satisfactory mixture with a farm disc. It must pass straight across the green and all turns must be made off the green. Sand or peat pockets develop when the disc turns on the green, or is operated in a circular path.

The other method is to mix soil, sand and peat in the proper proportions and spread the mixture on the green to the desired thickness. Mixing is done with a Royer or a Wichita grinder.

Tight Subsoil Needs Fine Gravel: The soil at hand is used to make the subgrade of elevated greens. It may be heavy in character and rather imperious to water. Working a 3 to 4 inch layer of pebbly fine gravel into the sub-grade before adding top soil will make the subsoil more open and permeable to air and water.

Drainage Within the Soil: A film of capillary water surrounding the soil particles is the reservoir from which grass satisfies its water requirements. Any other water fills the voids between the particles and occupies space which should contain air. This is gravitational water which should not stay in the soil for any length of time. It should pass down rapidly, and will do so provided the subsoil has the many fine passage ways which are present in a well drained soil.

Tile Drains: A system of tile drains is required when natural drainage is inadequate. The herringbone system of design is the only satisfactory one where tile is badly needed. It resembles a tree in outline. The main tile line represents the trunk of the tree; the laterals correspond to the branches. The main should follow the direction of the general slope, and should bisect the green. The lateral lines should make a 45 degree angle with the main line and should be spaced not more than 10 to 20 feet apart. The trenches should be 18 to 30 inches deep and should be back-filled with pea gravel, or similar coarse material, to within 6 to 8 inches of the surface. A three or four inch tile is large enough for the lateral lines, and the four or six inch size is satisfactory for the main. A good quality of burnt clay tile is generally used. Cement tile is satisfactory in some sections.

Drainage of Greens on Hillsides: The soil underneath greens situated alongside, or at the base, of a hill is often saturated with seepage water. The water comes from the higher ground and flows under pressure. Saturation occurs mostly in spring when the ground everywhere is full of water. It may occur at other times in soggy spots fed by underground springs. The turf becomes thin or it may be killed completely in late winter or early spring. A deep trench located between the hillside and the green is needed to intercept the seepage water which flows under pressure. A line of tile

is placed on the bottom of the trench, and then it is back-filled with gravel right up to the top. This is the secret of success. Without this trap the water flows over the top of the tile and into the green. The gravel conducts the water down to the tile.

Surface Drainage: The important role of surface drainage is overlooked by many. They fail to realize that surface run-off is the quickest way to remove water. A well contoured green with good under drainage never stays wet very long.

A green raised slightly at the center and sloping away on all sides would have the best surface drainage. A course with every green like that would lack character. Yet many greens slope from back to front. The back part dries first and surface run-off from it keeps the front of the green wet long afterwards. Traffic concentrates on the front so it should dry first.

Every green should be shaped so the surface slopes in two or more directions. Sloping in three directions is preferable to two. It will insure more rapid and hence better surface drainage. Localized low spots which hold casual water should be removed whenever they develop as a result of settling.

The Use of Abrupt Contours is Bad: Some architects in this country have neglected the artistic features of design, have overlooked the necessity for effective surface drainage, and have ignored the effect of topography on maintenance. They studied and copied the features of the seaside courses in Scotland.

A golf green should harmonize with the surrounding landscape. It should look like it was carved by nature and not made by man. Severely contoured and heavily trapped greens may fit seaside landscapes. They may be in keeping with the rugged topography of Britain's seacoast and easy to maintain because of its cool moist island climate. Such greens do not blend into the rolling landscape of an inland country, and are hard to keep in America because of the continental type of climate. Summers are too hot and otherwise unfavorable in some regions, and winters are too severe in other sections.

Abrupt ridges, high knobs, steep slopes and depressed valley-like runways are outmoded on inland courses. These features reduce the amount of cup space on the green. The useful surface may become too small for the turf to survive the bruising effect of concentrated traffic. Yet the wasted area must be poled, cut, fertilized, watered, and treated with chemicals for disease, worm and insect control. Long sweeping contours are just as interesting for play. They simplify and cheapen maintenance.

An abrupt bank around the outside edge of an elevated green increases the cost of maintenance unnecessarily. They must be mowed by hand and kept moist in dry weather. Otherwise the outside edge of the putting area will become dry. Then the grass withers and turns brown. Longer slopes which permit mowing with a tractor and three gang unit are better.

Air Drainage: The movement of air across the surface of the green is very beneficial in hot weather. It tends to hold temperatures in check and to prevent dew formation. The grass stays healthier and disease is less formidable.

A dense growth of trees and underbrush around the sides and back of a green stops air circulation even though the green faces the direction of the prevailing wind. The trees and undergrowth act as a barrier. Summer breezes pass over the top of them and leave a dead spot on the green. This happens to greens located on hills as well as those in valleys.

The underbrush should be removed, and some trees also if necessary, to provide air passage through the barrier. When prevailing winds come from the side an open lane can be cut through the trees to make an air passage-way without detracting from the beauty of the green and its surroundings.

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Abrupt bank and knob in green cause desiccation (drying) injury during an open winter with little snow covering on the green.