

GRASS CLIPPINGS “36”

BASICS 3

RENOVATION

My friend Jack appeared to be doing quite well until I had another message from him *“There appears to be some confusion in the club about what is meant by renovation and it’s importance in good green’s management.*

My Reply - Hi Jack – this is all a question of “back to basics”. Although I might be repeating myself I would like to put all this into the proper perspective.

Your primary objective as a Green keeper (GKP) is to create and maintain a bowling surface which is completely covered by an even mat of healthy grass and allows the bowl to run at a reasonable speed on a predictable draw.

The trouble is that a green is not static and having created the green it is now your responsibility to keep it at that level.

Apart from having to control the growth of the grass you also have to repair or replace the grass which is damaged by the machines used in the preparation of the green for play and the regular traffic of players.

It has become a balancing act where you have to maintain a rate of growth which is slightly in excess of the rate at which the grassy surface is being damaged.

However good you might be as a GKP it is virtually impossible for you to maintain a perfect playing surface indefinitely. Subtle changes will be taking place on the green which, if left untended, will ultimately undermine your ability to maintain the desired rate of growth and compromise the surface you originally created

The time has come for you to take your green out of commission so that remedial measures can be initiated to prepare the green for another season - i.e. renovation.

“Renovation “can be defined as “the steps taken by the GKP to improve the quality of his turf annually beyond that which he can achieve through the normal cultural practices”

The Oxford dictionary describes the word “renovation” as “to restore to good condition and vigour” and this, rather aptly, **describes the series of procedures**

undertaken by the GKP to prepare the green for the coming season.

Note Renovation must be regarded as the preparation for the coming season and not as the end of the previous season.

The next phone call was not long in coming – “ *Could you be more explicit and explain (a) what are these changes which occur on the green (b) what are these procedures you mentioned to restore the green to it’s former glory and (c) when is the best time to do all this.*

1 Compaction

One of the most difficult and expensive issues to confront the GKP is soil compaction. Of all the changes which occur compaction is the most important but, also, the one that cannot be cured – it can only be alleviated.

To understand compaction and the problem associated with it you must know a little about soil – the growing medium.

Soil is composed of millions of particles which all lie together. The space between the particles is called the **pore spaces**. Apart from the fact that the particles provide physical support to anchor the roots of the grass plant it is the pore spaces which are of importance to the GKP. In these pore spaces between the particles one would find roots, water, air, nutrients, organic matter, and micro-organisms (bacteria fungi)

The size of the particles would determine the size of the pore spaces with the larger particles (sand) having larger pore spaces and free access to the constituents of the pore spaces while soil composed of small or finer particles (silt, clay) would have narrower pore spaces and with the roots occupying a large proportion of those spaces freedom of movement for the other constituents would be limited.

Sustained leaf growth can only occur if there is a regular supply of water and nutrients coming from the roots. For this to happen (a) water and nutrients must be available in the soil, (b) micro-organisms must be present to convert (or digest) the fertiliser elements into a form which is acceptable to the roots, and (c) the root system must be capable of absorbing and conveying the water and nutrients to the leaves.

As the concentration of these ingredients is limited it follows, therefore, that the greater the area covered by the root system the easier it will be for the roots to maintain a regular supply to the leaves. Any limitation or retraction of the root system would restrict the amount of nutrients being conveyed to the leaves, thereby adversely affecting the growth potential of the grass plant and, ultimately, the playing surface of your green.

Like any living thing the roots need oxygen to survive. The roots have to “breathe” and draw oxygen from the air which has infiltrated into the root zone forming tiny pockets of air trapped in the pore spaces.

Water on the surface will, by the force of gravity, percolate through the different layers of soil leaving a vacuum behind it. This vacuum will draw air (oxygen) from the atmosphere into the soil (root zone). When you irrigate the green you must supply sufficient water to ensure that all the pore spaces are filled. The passage of this volume of water through the root zone would maximise the amount of air sucked in from the surface.

As the oxygen is slowly taken up there will, eventually, be a level where all the oxygen in the air is depleted. This would be the level below which the roots would not be able survive.

Note You should realise that, apart from the roots, the micro-organisms in the soil also depend on oxygen to survive. Their role in the soil is to break down the fertiliser elements so that they can become available for absorption by the roots. They are, in fact, competing with the roots for the oxygen in the pore spaces. Their presence in the soil would be limited to that part where oxygen is available.

Note - It is important that you should understand what appears to be a paradox i.e. that the roots need both water and air in the root zone to fulfil their function . There must be a period during which water is available in the root zone and, there must, also, be a period during which oxygen is available in the root zone for the roots to survive.

The ability of the root system to fulfil its functions is directly related to the amount of oxygen available in the root zone. It is

up to you to leave sufficient time between irrigations to allow the roots to take up the oxygen.

You will understand by now that the depth of the roots is determined by the presence of oxygen which, in turn, depends on the size of the particles with sand particles allowing a freer flow of water thereby allowing more air to be sucked into the root zone than would happen with the smaller clay particles.

(Note In predominantly sandy soils with less than 3 % clay the roots could, easily, reach 100 mm in depth. In clayey soils (30% clay) the root system could be limited to 15 m)

If the texture of the soil was all that mattered you would learn to cope with it but, there is an added complication – **compaction**.

Compaction is a physical condition resulting from the compression of soil particles into a relatively dense mass. On a bowling green compaction is progressive and can be attributed to the weight of the mower (2.0 Kgm / sq. cm.) as it mows the green and the pressure of the players (5.7 Kgm / sq.cm.) regularly compressing the soil particles on and immediately below the surface of the green. This would be more pronounced on the perimeter of the green where the mat is placed and the players stand as they await their turn to play.

Compacted soil contributes to numerous turf related problems. Reduced pore space in the soil adversely affects the infiltration of water and air thereby affecting the response of your grass to these changed conditions.

In compacted soils water and air would take longer to pass through the root zone. The level at which the oxygen in the air is depleted is now much shallower than before with the result that the roots must retract. Their area of effectiveness i.e. the area from which the roots can draw the nutrients, is diminished and they would be hard pressed to find sufficient water and nutrients to maintain adequate plant growth

The response of the plant to soil compaction would include not only reduced root growth, reduced shoot growth, reduced water and nutrient uptake,

reduced tolerance to heat and drought but, also, increased susceptibility to scald.

One can say that soil compaction would influence your cultural programme. More frequent fertilisation and irrigation are required to compensate for restricted rooting and general poor growth

No GKP can say that he does not have compaction. The degree of compaction can depend on - (a) the amount of traffic

(b) the shape of the particles

Traffic Density of traffic would influence the potential risk of compaction.

Shape of particles Perfectly round particles would resist compaction whilst angular or elongated particles might fit more easily into each other and more likely to occlude the pore spaces.

Dealing with Compaction

You must understand Jack that compaction is part of your life as a GKP – you cannot avoid it. You cannot un-compact soil on a bowling green you can only alleviate it.

In your garden it is easy to use a small fork to loosen the soil around your plants but on a bowling green you can only create new passages for the air by aerating your green.

Aeration can be achieved by (a) Hollow-tining (b) Verti-draining (c) Water - aeration

Hollow - tining - **Hollow tining** is the practice of driving a **hollow** steel tine into your grass surface and removing a plug of grass and **soil**.

Remember that both the depth the tine penetrates the soil and the spacing of the tines is crucial in performing a beneficial aeration.

The diameter of the tine can vary according to what is required. If it is simply a need to aerate the green then a narrow 6-8 mm tine would suffice. If you want to introduce compost or sand into the tine holes then a larger diameter tine would make it easier to introduce the material. You can even go to 50 mm tines if you need to alter the texture of your soil – soil substitution. Just remember that the larger your tine holes the longer they will take to recover.

If you are only aerating the soil then your main objective would be to allow all the roots to have access to the air. To achieve this, your tine holes should be as close to

each other as possible without disrupting the stability of the soil. Small narrow tines placed close together would suffice.

In a city it would be possible to hire a big machine to hollow-tine your green which it should do in a few hours. If you do not have access to such a machine hollow-tining by hand - held forks could take up to a week depending on the availability of labour.

Whatever method is used you must be careful when you remove the cores so that they are not swept back into the holes.

Verti-Draining - Verti-draining is a process where the soil is shattered and multiple fissures are created in the soil profile, thus allowing air into the soil.

Solid tines are driven into the soil at an oblique angle. As the machine moves forward the tip of the tine is swept back in the soil with the entry point of the tine at the surface of the green acting as the fulcrum. The soil in the root zone is disturbed while the entry point remains small. Play is possible within a day.

It is possible to adjust the depth of the tine so that the maximum benefit is achieved about 15-20 mm below the existing level of the root system thus allowing air (oxygen) to infiltrate to a level lower than the existing roots.

Water Injection - Water Injection Cultivation is one of the most revolutionary new ideas to be applied to sportsturf management.

Water is injected under ultra high - pressure through the surface of the green into the root zone. The water will create “caves” in the root zone and when the water has dispersed air (oxygen) will follow it and fill the “caves”. It causes virtually no surface disruption and play is possible soon after treatment.

Note - Many years ago farmers realized that if they always ploughed their land to the same depth they would get a “plough sole effect” i.e a smooth impenetrable layer at the same depth. This can happen on a bowling green if you always aerate to the same depth. You must take care to alter the depth of your aeration every few years.

If the machinery used to aerate the green is not available you will have to resort to aerating by hand. This is a slow and

tedious business and will leave your green out of action for a longer time but should never be put forward as a reason for not aerating the green every year.

I anticipated the next communication and it was not long in coming “ *My club committee and I have studied your letter and we all appreciate the importance of aeration. The only question now is how often do we do this?*”

Well Jack this would actually depend on the texture of your soil and the traffic on the green.

To start with accept the fact that aeration would be part of your annual renovation.

Under normal circumstances one can expect the texture of the soil to be predominantly sand with not more than 10 % clay. Even with a traffic count of 350 players /green / month you could probably get away with only having to aerate annually.

If the clay content is above 10% you might have to consider an additional session of aeration.

If your traffic count is above 350 /green / month then you should, also consider an

additional session but in this instance you could, probably, get away with only doing the perimeter of the green.

You will, by now, have enough experience to recognize when your grass is under stress. While there might be many reasons why a patch on your green is not doing so well you must never ignore it - find the cause.

If you are in doubt then your final yardstick would be the depth of the root system. If, over a period, there is noticeable reduction in the depth of the roots then you will know you are in trouble.

On any persistent weak or bare area you should hollow tine that part while avoiding any active cultivation eg mowing.

I think we have done enough for the time being. In my next letter we will discuss the other reasons for renovation.

SUMMARY

Grass Clippings 36

“Renovation”

Grass Clippings No 36 is one of the “Back to Basics” series.

It deals with the changes which take place on a green every year which necessitate the Green keeper (GKP) taking that green out of commission every year in order to “renovate” the green.

Whilst the need to renovate every year is non-negotiable the timing of renovation could be left to the GKP and his committee.

Of all the changes which take place on the green compaction is probably the most traumatic to the green.

To understand compaction requires a working knowledge of the structure of the root zone and the part played by the pore spaces in facilitating the conversion and absorption of nutrients and the effect obliteration of these pore spaces would have on the maintenance of a healthy playing surface and the changes in greens management which are forced upon the GKP.

The need to aerate the root zone and the mechanical devices available to deal with aeration are, also, dealt with.

In the next issue of Grass clippings the other procedures involved with renovation will be explained.