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Big news for all of us is the fact that your Bowls SA Greens Standing Committee has finalized the Curriculum for a Level One Green keepers Certificate. As this Certificate will be the entry level Certificate for further advancement we have decided to compile and publish a book "Guidelines to Level One Green keeping"
More information will be forthcoming when the book is available.
A bit of research has indicated that my literary gems are only read by Green keepers and not by the Committee members – my original target. A number of Green keepers have sent me the odd query re some of my articles – this issue will ,therefore, be a bit of this and that

Homo Sapiens vs Cynodon

Having been involved with the human body since 1947 and having been involved with green keeping since 1949 I have never stopped to wonder how many of our bodily functions and requirements are not duplicated in the grass plant

1.0 **Food for Thought**

Carbo-hydrate Production - A human being, whether he is resting or running a marathon, is burning up energy. The source of this energy is the Carbo-Hydrates (CHO) stored in various parts of his body. Once these CHO reserves are depleted he has to ensure that there are enough CHO (Sugar, bread, rice and fruit) in his diet to make up for that loss.
His intake would depend on how much exercise he has been doing eg. An athlete in training would require a large supply of CHO if he is to continue performing well through the season. The Human being controls his own intake and if he needs more CHO he eats more.

Whether the grass plant is inactive or growing vigorously it is also burning up energy, Again the source of energy is CHO stored up in various parts of the grass plant.
In contrast with a human being the grass plant has to manufacture it's own CHO. It does so by the process of photosynthesis which takes place in the leaves, Water plus Carbon Dioxide plus sunlight become Carbo – hydrates. As long as there are enough leaves, water and sunlight the grass plant will grow vigorously with any surplus CHO being stored in the stem and roots.
Unlike the Human being the grass plant depends on the Green keeper to ensure that there is sufficient leaf area and water to enable the plant to produce enough CHO

If the GKP, in his quest for speed, reduces the leaf area or, reduces the water supply the amount of CHO produced will not be sufficient to enable the grass to grow vigorously – the grass plant will stop performing

Vitamins - Apart from the need for CHO to supply the fuel to meet his energy needs. A human being needs substances called "vitamins". These substances are normally found in our diet but before they can be absorbed they have to be converted into an acceptable form in our intestines.
Vitamins control most of the functions of the body and although all are not required in the same quantities they are all equally important. A deficiency in vitamins will soon become apparent in the form of various illnesses

The grass plant also needs "Vitamins" to control growth and improve the plants resistance to infections. These "vitamins" occur naturally in the soil as chemical elements but on a bowling green have to be augment by the application of what we call fertilizers to the soil surface after which rain or water will take them to the root area where they are broken down into an acceptable form before they can be absorbed by the roots and conveyed to selected parts of the grass plant. A deficiency in fertilizers will soon become apparent as growth in the grass plant slows down and invasive weeds and fungi take over the green

2.0 **Organisms**

Benevolent Organisms - The world is full of organisms like fungi and bacteria. By far the majority of them are benign organisms and perform an important function in our bodies. Many of them are found in the intestines where the food we have eaten is broken down into an acceptable form by these organisms before they can be absorbed.

In the case of the grass plant the organisms are found in the root zone where they are also required to break down (or digest) the fertilisers before they can be absorbed by the roots. Unlike the Human being this process takes place outside the grass plant.

Semi-dormant Organisms - There are also the not-so-benign organisms. A human being (especially a child) will always have organisms in his throat (eg Streptococcus). Normally they are just there and not causing any trouble because the human being's immune system is keeping them under wraps – but – if for any reason his body is under stress or rundown these organisms will suddenly start multiplying and you end up with a tonsillitis or it's equivalent.

Similar organisms can be found in the soil (eg Sclerotinia). The GKP is not aware of them although he might see a few Mycelial threads on the dew in the morning – but - if misty or rainy

conditions prevail for a few days they will multiply and appear as dollar spots .
Both these conditions only need an anti-biotic when symptoms appear.

Malignant Organisms - There are a number of malignant organisms which are life – threatening if they come into contact with the human race eg TB / Typhoid. A person infected with one of these will need a specific anti – biotic to kill these organisms

The grass plant can be infected with specific fungi eg. Drechslera (Helminth), Phythium which also need specific anti-biotics to kill the organisms.

3,0 **Injuries**

(1) When any part of the human body is injured by bruising, laceration or an abrasion where a lot of skin is removed the body marshals its defense mechanism and repairs the injured parts. This means that a fair amount of energy will be used up in the process and additional CHO is required.

The grass plant is also exposed to injury by bruising (eg Mat wear) cut leaves (after mowing) and slashed leaves (from a badly adjusted mower). To repair any of these injuries would involve a run on the CHO reserves. .

(2) In the Human body a clean cut (with a knife) compared with an extensive abrasion (when little Tommy falls off his bicycle and takes a lot of skin off his knee) will heal the quickest and require the least CHO while an abrasion will take much longer to heal.

The same applies to the grass plant where a well-adjusted mower will cut the grass cleanly. This heals quickly whereas a badly adjusted mower will slash the leaves leaving an injury which will take a long time and a lot of CHO to heal

(3) When the human body is injured with an open wound the first reaction is to apply a sterilizing solution like Methiolate to the wound. If the wound has been open for some time and there is the fear that organisms have already entered the wound then the doctor might also give an anti-biotic which will be absorbed into the blood steam and fight the organisms from inside the body.

When the grass plant is exposed to a possible fungal infection the GKP would apply a contact fungicide like Copper Oxychloride. This will only kill the fungi which are present on the surface of the green at the time of application. If he thinks the infection is more general he will apply a systemic fungicide which will be absorbed by the grass plant and fight the infection from inside the plant.
An important thing to bear in mind is that when a person takes an anti-biotic there is the chance that the anti-biotic will also kill off the benevolent organisms in the intestine and upset your digestion for a while..

When applying a systemic fungicide to the surface of the green to kill fungi on the grass plant there is also the chance that this fungicide will also kill off the benevolent organism in the root zone and interfere with the conversion of fertilizers.
Authors Note There is a school of thought amongst Green Keepers that the indiscriminate routine use of a systemic fungicide without there being evidence of infection should be discouraged.
“Integrated Pest Management” is a programme aimed at keeping the grass plant so healthy that any preventative spray becomes unnecessary.
I have for a few years now dispensed with the use of these “preventative” fungicides in the early summer and confined myself to one fungicide in late summer. I have seen no increase in fungi on my greens.

A Single Grass Plant - A Million Grass Plants – One Entity

In “Grass Clippings 2 “I remarked on the fact that when we had inspected greens for SA Tournaments we had found that what had previously been “C” greens were now “D”s and even ”E”s. The commonest fault being the appearance of weak and bare areas on the perimeter (outer 3.0m) of the green.
This had come about because the leaf area left by the GKP was not enough to produce the Carbvo-Hydrate needed by the plant.
Some Green keepers (GKP) assume that the green is a single entity and that the whole green must be treated in the same way. If the green needs water and fertilizers it must be spread equally over the whole green. The whole green is mown at the same height and when the mat has to be “thinned out” the whole green is “thinned out” with possible, only enough leaf area being left for the required growth – **there is no spare capacity**
The GKP is making a very dangerous assumption.
The grass on the perimeter of a bowling green is subjected to a lot of trauma. Apart from the bruising and defoliation caused by the mower where it is turned at the edge of the green the players cause still more wear and tear.
In a full game of bowls a player would step on to the mat – deliver the jack – then step on the mat again to deliver his bowl and step off the mat again . This occurs about 100 times on each side of the green – mainly between 2 .0 and 3.0 metres from the ditch.
The damage inflicted on the grass at the perimeter is much more than that at the center of the green.

When the grass plant has been injured by bruising or defoliation it would require an immediate flow of CHO to the injured parts to provide the energy required to close off the wounds and start the healing process. In the process the plant is drawing on it's CHO reserves - that is assuming there are some reserves of CHO. If not, then the few undamaged leaves must produce CHO by photosynthesis

This process goes on every time play takes place on the green. If the GKP does not move his rinks regularly then there will not be enough time between games for the grass to recover – a bare patch will appear.

From the above it is obvious that the green cannot be considered to be a single entity but rather a conglomerate of grass plants of which some in certain areas have different requirements.

This is not a new concept, in 1950 I read an article on green keeping in which the author described the importance of maintaining a "Picture frame" green i.e. to cut the grass on the perimeter longer to ensure that the grass in that area had enough CHO reserves to combat this wear and tear,

This "picture frame" concept went into limbo for almost 45- 50 years and it is only recently that a number of GKP's have revived this practice.

Once the GKP appreciates the importance of providing additional leaf area for the perimeter he can work out a programme to suit his own conditions,

There are a number of things the GKP can do –

1 Increase the leaf area over the whole green – it would be counterproductive to increase the leaf area over the central part of the green because this is where the speed is generated.
2 Raise the mowing height by 1.0 mm (or allow a thicker mat to develop) over the perimeter
3 Only mow the perimeter once a week and change the turning point of the mower regularly
4 Apply a little additional water to that area after play (Note I have always advocated that clubs installing "pop-up" sprays should install sprays which only irrigate about 10.m in from the edge – this makes it much easier for the GKP to irrigate only the perimeter on the two sides where play had taken place)

I must admit that I have never seen a weak or bare area on the edge of a green where the GKP has religiously followed the "picture frame" concept,

Restoration of a Weak or Bare Area

Unless there is evidence to the contrary one must assume that a weak or bare area came about because the GKP thinned out the grass so much that there was not enough leaf area left to produce sufficient CHO to keep the plant alive It sometimes take some time for the GKP to realise he has got trouble and it is going to be a long hard slog to restore healthy leaf cover over that area. He might even have to resort to replanting that area but at first he must try to get the existing grass to grow.

The first thing a GKP should do is to stop **all** traffic on that part of the green

A sprinkling of compost (not sand) over the bare area might stimulate leaf growth

Wet it fairly frequently. The first leaves to emerge will be vertical leaves – they are to be left alone because they will be producing CHO.

When enough CHO is available to the grass plant lateral (or horizontal) stems will emerge from the bud. Soon there will be runners and leaves will emerge from the nodes on the runners. The GKP can now mow at 8.0mm.

Continue mowing at 8.00mm until there is sufficient evidence that the mat has formed.

Patience would be a useful attribute.

Renovation on the Highveld

I have had a number of queries from GKP's re renovation on the highveld where some Districts still insist that it be done in the Spring. As with everything else in green keeping it depends on CHO reserves. Winter on the highveld is characterized by cold nights and sunlit days. This combination will cause a loss of chlorophyll in the leaves of the grass plant – the leaves will turn yellow. **Production of CHO stops.**

Although the plant is dormant it is still alive and depending on its CHO reserves to keep it going

A prudent GKP who intends renovating in the spring will increase the leaf area in March/April to store up reserves of CHO.

Renovation (especially scarifying) takes a heavy toll of the CHO reserves because not only are some of the reserves destroyed by the scarifying but with all this trauma the grass plant will call on what is left of it's CHO reserves to repair the damage and to encourage new growth under the top-dressing.

I know of some GKP's who renovate in spring but do only a very light scarifying – in fact, they carefully remove only the grass on top of the surface and do not disturb the surface of the green at all.

In Australia some GKP's actually burn off the dry surface grass with a row of burners instead of scarifying.

If, in addition, the GKP stimulates new leaf growth in August (see 2.3 of Grass Clippings 6 page 2) to give himself three weeks of photosynthesis and CHO build-up he can safely renovate in September

Heavier scarifying should be reserved for December. – I remove about 5.0 cu.m of scarifyings off each green in December / January.