GRASS CLIPPINGS I6

PESTS

Sitting with a group of GKP's recently enjoying my favourite beverage in the green bottle -- straight from Holland - the discussion revolved round the use of pesticides.

I was appalled to find how many of them were applying pesticides **routinely** as a sort of preventative measure aimed at the possible invasion by organisms bent on destroying the grass.

I am, unfortunately, old enough to remember the days when DDT was used with a gay abandon without any thought for the damage being done to those organisms and insects which made an essential contribution to our continued existence on earth.

The dictionary tells us that a ":pest" is a troublesome or annoying thing. To the average gardener a pest is probably only an irritation but it can be a source of major concern to the Bowls GKP.

A turf pest is any organism causing a measurable deterioration in the aesthetic or functional value of the turf and would include weeds, disease-causing organism, some insects and other destructive organism.

Many gardeners and some GKP's regard pesticides as the answer to their problems – nothing can be further from the truth.

A pesticide is a valuable adjunct to the GKP's cultural programme but pest management, as such, is more than just buying the appropriate pesticide for a specific organism.

Pest management includes -

- the selection of a grass which is well adapted to the environment.
- following proper establishment procedures by conducting a cultural programme which encourages the growth of healthy turf
- applying the appropriate pesticide if necessary.

The most obvious deterrent to the entry of a pest would be that the host is so healthy that he is able to resist the invasion effectively.- or - alternatively the host is given the opportunity to build up a natural resistance to the invasion of a specific ":pest"

I do not think that there is a better way of understanding pest management in the grass plant than by first learning how the human body copes with a similar situation..

THE HUMAN BODY

1 Health

The human body is continuously exposed to an onslaught of organism and insects trying to gain entry into the body.

Apart from the normal portals of entry there can, also, be open wounds which have not had time to heal

If they are lucky enough to gain entry they will be met by the Human Defence Mechanism which will mobilise the white blood cells, enzymes, some proteins and antibodies which have developed after previous invasions.

The efficacy of the defence mechanism is unfortunately dependent on the state of health of the host.

To function efficiently the defence mechanism, uses up a considerable amount of energy.

This "energy " is drawn from the supplies stored up in various parts of the human body.

While the person takes in more energy (calories) than he is using up he will be able to store up energy and the defence mechanism can work efficiently

If the person takes in less than he needs and the supplies of "stored" energy become depleted then the various organs or systems in the body will start competing for whatever energy is available.

Because the vital organs have first call on all energy stocks the defence mechanism is fairly far down the queue and one of the first to suffer when stocks are low.

If one uses the standard term and say that the person is "run down" we are, in fact, describing a condition where that person has for some reason or other been "burning the candle at both ends "and has been using up more energy than he has been ingesting. – his defence mechanism is compromised and he is a "sitting duck" for any germs trying to gain entry into his body.

Germs will gain entrance into the human body in various ways –

- There are always germs present in our nasal passages, mouth, and throat.
- There are always germs present in the atmosphere waiting for the opportunity to gain access to the human body.

The body can cope with either of the above **while the defence mechanism is working efficiently.**

- There are virulent germs (eg Typhoid, ,Bubonic Plague) which, if given the opportunity to gain access to a human body will overcome most defence mechanisms.

These germs can only be dealt with by developing an immunity to them or by the use of antibiotics.

2 Immunity

Our body possess the ability to develop antibodies against most strains of germs or other substances to which we are occasionally exposed.

We even produce vaccines (diphtheria, small pox, polio) which when administered in small doses allow the body to develop antibodies against that disease

Inducing the body to produce it's own anti-bodies against such diseases is to be preferred to having to use antibiotics.

3 Antibiotics

Antibiotics have been available for about 70 years.

They have saved may lives especially in the war years with the treatment of open wounds but their availability has, also, created a dependence on them as "cure alls" with the more conventional methods of dealing with germs discarded.

The administration of antibiotics creates two problems -

1 If the full prescribed dose is not given correctly the "germ" will slowly develop an immunity to that particular antibiotic and the prescribing doctor will have to look for a new antibiotic. It is estimated that 70 % of people do not complete the prescribed course – it is, therefore, obvious that resistant strains will develop.

2 Most antibiotics are not specific and will "kill off" a wide range of other germs - many of them benevolent germs important to the welfare of the host. eg. Our digestive system is dependent on the presence of bacteria and fungi in the intestines which "digest" the food we eat to convert it into an acceptable form so that it can be absorbed from the intestines and taken up into the blood stream for distribution to various organs.

If, for some reason or other eg by taking an antibiotic which also destroys those organisms the food cannot be digested and will not be absorbed.

Doctors all over the world are concerned about the indiscriminate use of antibiotics to resolve an immediate problem without due regard for the consequences.

No one would think of prescribing an antibiotic just because they think the patient might be exposed to an illness soon – and yet that is what we are doing on the bowling greens.

THE GRASS PLANT

Having read the above we are struck by the fact that what happens to a human being is repeated in the grass plant – there are two exceptions –

1 In a human being his energy requirements are met by the "food" he eats - he is, therefore in charge of his own destiny.

The grass plant has to produce it's own "food" through the process of photosynthesis which, in turn, is dependent on the leaf area.

On a bowling green this places a heavy burden on the Green keeper to ensure that there are sufficient leaves to maintain the necessary level of nutrition in the grass plant with adequate reserves of stored energy.

2 In a human being the digestive process takes place in the intestines with assistance from the bacteria and other organisms present in the intestines.

With the grass plant the digestive processes take place **outside** the grass plant in the underworld (or root zone) where the bacteria and fungi present in the soil "digest" the nutrients and convert them into an acceptable form for absorption by the roots.

A Healthy Grass Plant

Few GKP's need reminding that the chaps with the healthier greens seem to have less fungal problems and less weeds.

As indicated above the ability of a human being to withstand the onslaught of germs and other organisms depends largely on his being able to maintain a nutritional level which enables him to counter whatever drain there is on his resources and still provide enough energy to keep his defence mechanism at a high level of preparedness.

In the grass plant the position is only different to the extent that, apart from having to ensure a regular supply of energy to maintain the defence mechanism at the desired level the GKPis, also, putting an additional strain on his resources by mowing the green regularly leaving millions of cut leaves which have to heal up as soon as possible before organisms can gain entry through the exposed wounds – all this uses up energy.

The Underworld

Let us now examine the "underworld – a part of the green which the GKP cannot see but would be very unwise to ignore.

Physically it covers the region we know as the root zone - from the surface of the green down to a level where oxygen is no longer available in the soil which also happens to be the lowermost point reached by the roots.

In the soil one group of bacteria would be involved with the oxidization of ammonia, iron, manganese, sulphur, and other elements while another group's sole function would be to dispose of the waste matter resulting from all these processes by decomposing organic matter and recycling nutrients contained within the plant and animal residues.

Note – Some time ago I read an interesting article on the ratio of bacteria to fungi in the underworld. The article dwelt on the fact that different crops required more or less bacteria than fungi and the writer went so far as to claim that, if one established the ratio between the bacteria and fungi in a soil sample one could tell what crop had been planted.

The pore spaces are alive with a huge population of it's own micro-flora (bacteria, fungi, and algae) and microscopic animals in the form of micro–fauna (protozoa and nematodes)

Macro-flora (live roots and other plant parts) are also found in the pore spaces

The macro-fauna are the larger "animals" inhabiting the area in the form of earthworms, insects, mites and even slugs and moles.

All these organisms and "animals" are, in their own way contributing to the welfare and sustained growth of the grass plant

Soil organisms are largely beneficial to the plant in that they convert material into a form which makes it available for absorption by the roots – they also improve the soil structure eg Earthworms do not feed on live plants but are extremely effective in reducing the accumulations of residual organic material.,

Although their worm casts are a nuisance to the GKP because they increase the wear on the bottom blades of the mower the advantages of having earthworms in the soil far outweigh the disadvantages of having the worm casts removed. A study in the U.S.A. showed that removing earthworms led to an increase in thatch formation.

All these organisms are alive and will only stay alive if the green keeper allows them to stay alive

THE GRASS PLANT – ON A BOWLING GREEN

In the same way as a human being will succumb to an infection more readily if under stress so will the grass plant be more susceptible to fungal attacks or invasive weeds if under stress.
We have all seen how dollar spots (Sclerotinia) can appear overnight after a few days of misty rain and overcast conditions.
The point is that in the same way as there are always germs in our throats so are the Sclerotinia always present in the soil but normally kept at bay while the plant is healthy and atmospheric conditions are not partial to the multiplication of sclerotinia. But, given a few days of misty conditions the spots will appear and **d**isappear within a few days on a healthy green without any treatment whereas a green under stress might require the application of a fungicide to clear them.
There are other fungi which are not normally found on the green but will be carried by wind, water, or, other agents on to the green and invade the grass plant. They do not produce food themselves and depend for their growth on the food they derive from the host plant
Any growth of a fungus will be accompanied by a deterioration of the plant.
Unless they are particularly virulent or the environmental conditions are favourable these fungi can be prevented from invading the grass plant as long as it's defence mechanism is working efficiently.
At the same time weeds may make their presence felt on a green.
Before turning to a herbicide the GKP must always realise that the presence of weeds on his green could indicate an underlying problem which might have affected the ability of the plant to counter the invasion of weeds.
Weeds on a bowling green during the growing season are plainly the result of bad greens management because healthy grass will always prevent weed proliferation during the time of maximum growth.
The grass plant must be under severe stress in the summer to allow weeds to take over their territory.
The defence mechanism of the grass plant is not employed when it comes to weeds but the presence of weeds in the summer is an indication that the grass is under stress and that the defence mechanism could be found wanting if a fungal invasion had to occur.
Admittedly weeds find their way on to a winter green when the grass plant is fairly dormant.
The GKP should handle Pesticides with care and give due consideration to the possibility that some beneficial organisms or smaller animals might be "killed off" by the pesticides

INTEGRATED PEST MANAGEMENT

Many prominent GKP's all over the world have become concerned about the indiscriminate use of Pesticides and the fact that we are continuously being forced to develop stronger pesticides because of resistant strains being evolved all the time.
There is, also, the need to preserve the benevolent organisms in the soil.
Integrated Pest Management is the term used to describe a programme where the GKP depends on the natural mechanisms in the grass plant to withstand the entry of pests before resorting to the use of antibiotics to kill off these pests.
What the programme really amounts to is –

- that the Green keeper should consider his options before succumbing to the cry for speed and reduces the leaf area to a level where the nutritional efficacy of the grass plant is not compromised by a shortage of stored carbo-hydrates.
- That the GKP should delay the application of a fungicide until he is certain that the plants defence mechanism is ineffectual and then having applied the fungicide to ensure that the full dose is applied and the causative organism is completely eliminated

In a human being, we advocate bland foods after the ingestion of a anti-biotic while the intestinal flora is being restored
In the grass plant we would advise a short period during which the leaf area is increased to allow for the production of an additional supply of Carbo-hydrates.
The moral of the story is that if the GKP concentrates on the health of the green he will be surprised how much fewer pesticides he uses during the year.
Just applying a fungicide because you are scared of a fungal attack is not on and should t all costs be avoided.

P.S. Level One Examinations.

We are pleased to announce that quite a number of Districts expressed an interest in the Level One Certificates and have established Examining Committees in the District
Those Districts are now in a position to call for applications from Green keepers to have their greens assessed..
Candidates are reminded that while the examination is mainly aimed at the GKP being able to produce a "C" Green he will also be asked questions relating to the contents of the Level One Book which was issued through the Districts.
Where a District has not established such a Committee their Green keepers will not be able to apply for a Level One certificate.