



where this can be carried out. This will require facilities for making draining and replenishing oil fast and easy. An air compressor would be ideal for blowing dust and dirt from around cooling fins of engines and hydrostatic drives, or inflating tyres. Other items should include, a comprehensive set of tools, spanners, grease guns, fast moving replacement parts, instruction manuals and fuel storage facilities.

As far as breakdowns, major servicing, overhauling or regrinding are concerned, a local specialist can be sought, who has the qualified staff to carry out this type of work. This could work well if a service contract is drawn up between both parties, so everyone knows exactly what is expected of them. When deciding on a suitable partner, in this venture, an assessment should be made of their service facilities and staff, as to whether they are adequate for carrying out the work you are likely to require.

An important aspect in any arrangement is that both parties work well together, so that each understands the others requirements and needs. For instance, the climate has changed considerably over the last few years. As a result mowing is now carried out for virtually twelve months. This means that any time available for major overhauls is limited, so to avoid machinery being out

of commission for too long, some plan needs to be put into place. By forming an alliance an acceptable solution can be found that satisfies both parties.

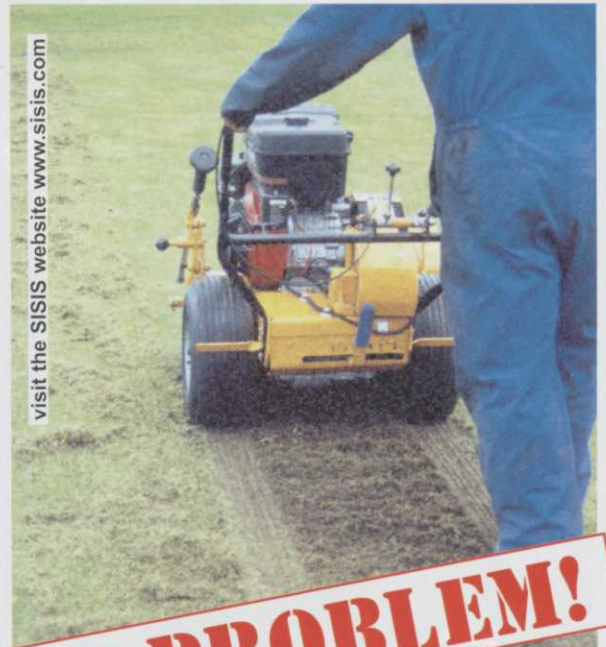
For clubs, service contracts can be a positive way forward. A major benefit is that they do not have to make a considerable investment in specialist workshop equipment and buildings. In addition, there is not the problem of having to find qualified staff from what amounts to a small pool of experts that is gradually disappearing.

Modern machinery requires less maintenance than in the past, but when things go wrong it is often far more complex to deal with. Keeping ahead of these developments is down to specialist technicians with the right testing equipment.

From the service outlet's point of view, by being tied into a contract they can ensure there are trained staff, tools and equipment to cover every eventuality.

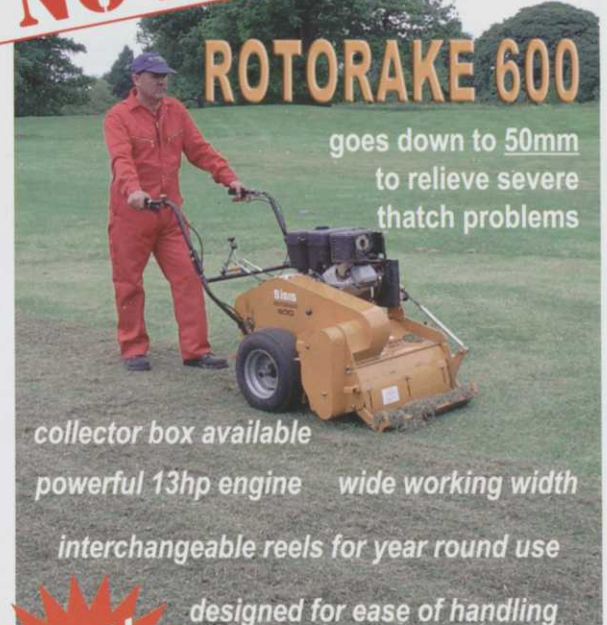
What worked a few years ago may not be ideal or adequate to meet today's demands. For those clubs large enough there are distinct benefits having their own service departments. Smaller clubs can, by forming a close liaison with a local service outlet, also enjoy certain advantages. It is to everyone's benefit to work together to keep machinery on the move.

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Scott MacCallum travelled to Cheshire to meet Steve Hartshorn, Course Manager of Heyrose GC

# BLUEPRINT

## FOR A SUCCESSFUL CLUB



The boom in golf course construction in the late 80s early 90s saw many developers finish up with charred digits and empty pockets. But it didn't have to be that way.

Some course developers actually, and you may find this hard to believe, used the same business acumen in building their golf course as they did in the walk of life in which they had originally become successful. Remarkable I know.

Listed among those would be Eric Bridge and his son, Christopher, who founded and built Heyrose Golf Club in Knutsford, Cheshire, 12 years ago.

Using the "Walk before you Run" philosophy the family started out with nine holes, began attracting members, then extended to 18 hole before building a clubhouse.

Having then got as far as they could using their limited knowledge and

skills to manage the course they appointed a Course Manager, who moved the course on to the next level. Now the club has just finished rebuilding the first nine greens to a much higher specification than the, sensibly pitched, original funding had allowed.

It all means that Heyrose Golf Club has grown at a sensible rate and injected the investment when the foundations for a successful club were in place thus protecting itself from the vagaries of a volatile leisure industry sector.

The man who the Bridges installed to provide the greenkeeping know how is 40 year-old Steven Hartshorn, who has shown the benefits of having a specialist in post.

The great thing was that it was the owners themselves who had recognised the need for specialist help.





"I think they knew they'd gone as far as they could with the knowledge that they had and that they needed to employ a greenkeeper."

The first thing Steve did when he arrived was put work schedules in place including aeration programmes and good greenkeeping practices; work on the presentation of the course - the infamous landing strip style fairways were a feature - and put a programme in place to enlarge the tees.

"Prior to that work had been very intermittent. If they thought the greens were a bit long they'd cut them rather than having daily maintenance schedules while the bunkers were not

really up to standard and the course furniture was a little careworn."

He was given every support when he joined and what he asked for was made available to him.

"Even before I'd taken up the position they'd gone out and bought a John Deere compact tractor so it was waiting for me in the sheds when I started."

The Bridge family - Christopher looks after the club finances while his wife, Elizabeth, is the Club's General Manager - are particularly go ahead, while it was father, Eric, whose concept Heyrose Golf Club was.

"He had played golf for about 35 years and been Chairman of Green at Knutsford Golf Club and was very much a supporter of the greens staff but then told them that he'd rather go off and build his own course. And that's exactly what he did," recalled Steve.

The limitations in the existing greens construction became apparent to Steve fairly early on.

"The fines within the rootzone had slowly been working their way down and as Heyrose, like many courses built in the 80s, didn't use an intermediate blinding layer but instead had a geotextile membrane and the fines had moved down and blocked it."

Having made the decision that the greens had to be reconstructed, what





would have been a medium term plan possibly involving one green a year became slightly more urgent with the recent wet winters.

"Two years ago we decided to do the 11th, which was the worst green on the course. We had dug some holes out of the rootzone and poured 25 litre drums of water into the stone underneath and it was going so it was pretty obvious nothing was wrong with the drainage but that it was the rootzone that was the problem.

"It was indigenous soil mixed with sand and sand and clay makes bricks it doesn't make quality golf greens," said Steve.

He did receive a bit of a shock when the subject of who was going to design the new greens was talked about.

"They said 'You are.', So the many training courses he'd attended including Golf Course Design with Howard Swan and Simon Gidman at BTME became all the more valuable.

"I'd also picked up experience of building greens at Lingfield Golf Club and Chichester where I was involved in the growing in and where Pearson's were on site. I enjoy getting to know people and picking up tips and information."

The 11th was to be the only green to be done at that particular time so

Steve restrained from producing any outlandish design features.

"We didn't want to be too ambitious if it was going to be the only green we did so the design was relatively conservative," he explained.

The construction work was carried out to Steve's design specification by John Mallinson's, of Ormskirk, who were also involved in the construction work for Manchester's Commonwealth Games stadium.

"They were excellent, very professional, and the design specifications I laid down for them were followed exactly," said Steve.

It was decided that turfing would be the best option as it offered the opportunity to get the green back in play quicker and various samples were examined.

"We brought in a Rufford rootzone and chose Inturf for our turf, and they've been super. We did consider washed turf but opted instead for a quality turf in a sandy medium.

"We found the Edwards family to be brilliant. Whatever backup we've needed has been there and they are honest, in that they'd advise us to wait a couple of weeks if they felt the turf would be better then."

The new green was laid in January 2000 and opened for play at the beginning of June.

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"The root development was incredible. It was throwing roots down for fun and virtually overnight you could see a huge improvement in the quality of the green," he revealed.

Having seen this success, the decision was made to build four more in the autumn of the same year.

"But, as we know, that winter was awful and we couldn't get the machinery onto the course so we didn't start until February 2001 with the next four worst greens, the 10th, 12th, 13th and 17th earmarked."

And on this occasion Steve was able to give much fuller vent to his design flair.

"The greens were enlarged and two of them moved location with one of them, the 13th, pushed behind a pond which the owners had always wanted to bring into play but which had previously been 20 yards behind the green.

"I ensured that there was an alternative route to the green avoiding the pond and we had to clear the area of trees, scraggy alders and willows and clean out the pond but it turned a par-4 into a par-5, 87 yards longer than before."



"The 10th was also fundamentally changed, the 12th green was on the same site but the complex was completely changed while we introduced McKenzie swails into the 17th green.

The work was completed in early April and they opened for play at the end of June.

"It was very ambitious but because it was early spring we were again getting phenomenal root development - an inch per week, I've never seen turf throw down root like it - and the turf was coming in nice and thin with very little thatch in it."

The final four holes of the back nine - the first nine that was built - were started last October and finished in the final week of February.

"They are doing very well and it means that we have done the entire nine in two years which is great considering that we had envisaged doing one a year. The front nine greens are not as crucial as they do drain better. There are limitations and given the required finances they will be done but that doesn't need to be straight away.

Heyrose is a successful club - they have also just appointed former European Tour pro, Paul Affleck, to be their Club Professional -and a model for any new club wanting to develop from modest beginnings. In Steve Hartshorn and his five man team they have the expertise to continue that development.

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- John Deere 6x4 Gator
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- Jacobsen LF3810
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- Kubota B2150 Compact
- Multicore TM1000
- Proseed
- Sisis Multitine
- Sisis Multislit
- Sisis Topspread
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- Amazone Groundkeeper
- Progressive TD 65-2 Trideck
- 2 Jacobsen 810 Express
- Saxon PM100
- Ransomes Supercertes
- Brouwer EY15D
- Husqvarna 232 Strimmer
- McColloch 3000 Strimmer
- McColloch Promac Strimmer
- Stihl BR400 Blower
- 2 Allen 218si
- McColloch 10-10 Chainsaw
- Stihl 039 Chainsaw
- Robin HT231 Hedgetrimmer
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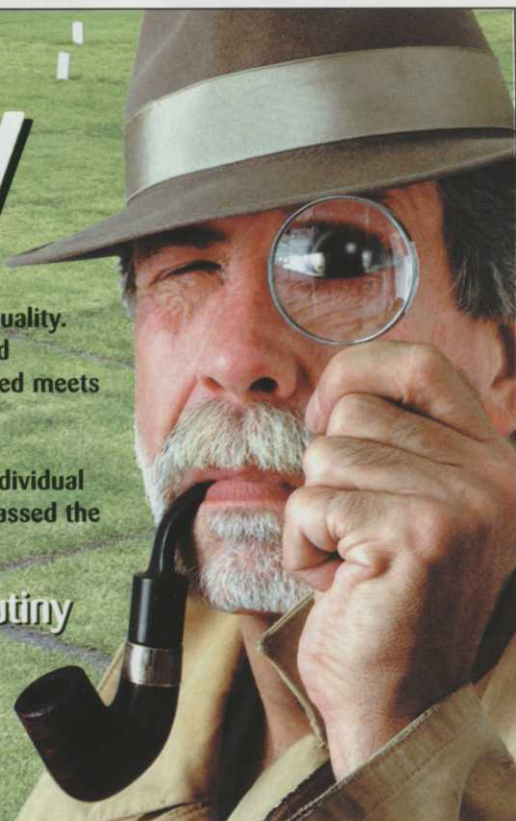
30% Chewings Fescue, 25% Slender Creeping Red Fescue, 35% Strong Creeping Red Fescue, 10% Browntop Bent



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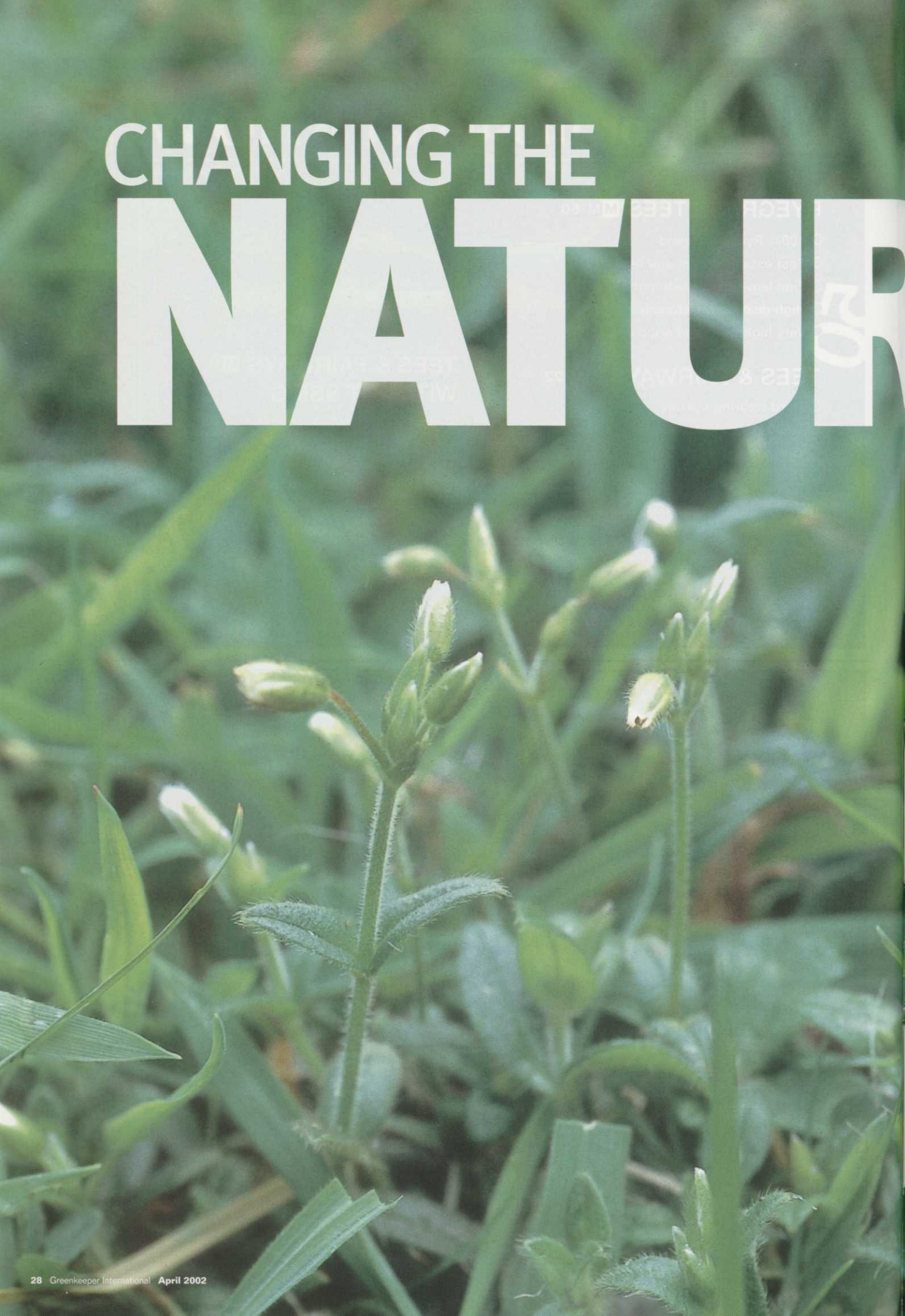
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# CHANGING THE NATUR







THE GOLF GREEN  
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 NATURE  
 PLANT GROWTH STRATEGIES  
 Primary growth strategies  
 from the greenkeeper's perspective  
 by Henry Bechelet

**Henry Bechelet, Turfgrass Agronomist, STRI North East Region discusses the issues raised when changing the type of grasses in your greens**

# REFLECTIONS OF YOUR GREENS

## THE GREATER GOOD

**Do you want to change the types of grasses contained within your greens? The objective of this article is to give a greater understanding of the survival strategies developed by the individual turfgrass species. By doing this, I hope to give you the ability to alter, improve or stabilise the quality of your golf greens. I mean to get you thinking about your greens differently.**

**This article is adapted from the work of Grime, Hodgson and Hunt in their study: "Comparative Plant Ecology - A functional approach to common British species" (1988). This work states that the vegetation that develops in a place at a particular time is governed by environmental pressures. These pressures may be categorised as stress, disturbance and competition and they can vary in their relative intensities. These pressure factors are described as the three main threats to existence. I make my own interpretations of this parallel work.**

## THREATS TO EXISTENCE

### Stress

Stress is described as the environmental phenomena that restrict photosynthetic production. These are the environmental constraints to growth and regeneration. Stress may take a number of different forms, for instance shortages of light, water, mineral nutrients or sub-optimal temperatures. Stress factors may be inherent to an impoverished environment (low fertility, soil acidity) or may be induced (shading or deliberate droughting). Here we are concerned with one or more stress factors that are operating throughout the year to constrain all species within the environment. Stress factors do not necessarily act in unison, different stresses exert different selection pressures. Greenkeepers have their hands on the reins of certain stress factors, such as fertiliser input, acidification or irrigation.

### Disturbance

Disturbance involves the partial or total destruction of the plant biomass, i.e. the physical damage or removal of living tissue. This may be caused by the activities of pests, pathogens, wind damage, frosting, etc. The primary factors of disturbance within the golf green situation

are mowing, scarification, verticutting, grooming, wear damage, disease outbreaks, pitch marks, divots and pests - not inconsiderable.

Disturbance places a high selection pressure upon the vegetation inhabiting an unsettled environment. Rapid recovery or regeneration is required to exploit regular disturbance.

### Competition

Competition is the tendency of plants to try to monopolise the resources of an environment at the expense of their neighbours. Competition describes the battle for the same quantum of light, ion of mineral element, molecule of water or volume of space. It refers to the ability of the plant to capture resources and, by doing so, suppress the fitness of a neighbour by modifying the environment. This can

occur above and below ground. Competition becomes characteristic of environments that contain an abundance of resources and experience a low intensity of disturbance (unsettled).

### Evolution

Each environment exerts confining pressures on its inhabitants. These may be external factors such as stress and disturbance or internal such as the competitive ability of the plant itself (given a chance). Plant growth strategies have evolved over time to exploit specific environmental conditions to forward the continuation of the species. Nature works in a direction.

The primary growth strategies may be categorised by relating the intensity of stress and intensity of disturbance (external factors) within the environment. See table below:-

Table 1. The basis for the evolution of three strategies in plants. Grime (1977).

Intensity of disturbance	Intensity of stress	
	Low	High
Low	Competitors	Stress-tolerators
High	Ruderals	(No viable strategy)

## THE GOLF GREEN ENVIRONMENT

The following table recounts the results of the STRI survey of golf greens carried out in 1995 by Baker, Binns et al. This clearly illustrates the kind of greens that are being produced by modern day greenkeepers in the UK.

Table 2. Species composition in relation to course type. Baker, Binns, Hind, Lodge & Hunt (1995) J. Sports Turf Res. Inst. Vol. 71.

Course type	No. of Cases	Ground Cover (%)		
		Agrostis	Festuca	Poa annua
<b>Parkland</b>	<b>67</b>	<b>29</b>	<b>2</b>	<b>63</b>
<b>Links</b>	<b>16</b>	<b>28</b>	<b>8</b>	<b>58</b>
<b>Meadowland</b>	<b>17</b>	<b>18</b>	<b>2</b>	<b>68</b>
<b>Moorland</b>	<b>9</b>	<b>19</b>	<b>0</b>	<b>71</b>
<b>Heathland</b>	<b>8</b>	<b>29</b>	<b>2</b>	<b>58</b>
<b>Seaside</b>	<b>8</b>	<b>25</b>	<b>1</b>	<b>64</b>

Annual meadow-grass dominates in all the different types of golf course (even links). The predominance of Poa indicates that a highly disturbed low stress environment is being produced.

### Management pressures

The environmental pressures affecting the golf green may be listed as follows:-

- Disturbance (physical damage) - Mowing, grooming, verticutting, scarification, hollow coring, disease scars, pests, pitch marks, divots, WEAR.
- Stress (environmental limitations to growth) - Not a great deal, although soil acidification should not be forgotten. I also regard soil compaction as a stress factor. Irrigation practice and the regular application of healthy fertiliser programmes maintain a highly productive environment. More northerly courses suffer extended periods of low temperature.
- Competition does not exert itself in disturbed environments although thatch production may well mask the surface.

It is not surprising that Poa is dominating - disturbance abounds!

## PLANT GROWTH STRATEGIES

### Primary growth strategies

From the table above, depending on the intensities of the environmental pressures, we see that there are three main growth strategies for plants in their established phase - Competitors, Stress-tolerators and Ruderals.

(Note that there is no possible growth strategy for a highly stressed and highly disturbed environment - such an environment is untenable because the external pressures are too extreme to allow a plant time to survive.)

Stress-tolerators (**S-strategists**) have evolved to exploit high stress and low disturbance environments. They have the ability to retain resources in a continually hostile environment (deep roots or hardy vegetation for instance). S-strategists (heather in the wider world, due to soil acidity) are slow growing with the conservation of resources all important. The vegetation is hardened, tough and often difficult to break down. These plants are adapted to clinging on in the face of adversity. Soil acidity is a stress factor that selects, not kills.

Ruderals (**R-strategists**) inhabit low stress, high disturbance environments. Quick reproduction is all-important. Ruderals (weeds) are characterised by fast growth and rapid seed production. There is no point in these plants investing in deep roots because the environment is so unsettled. Preservation and development of the species is the singular imperative for such volunteers.

Competitors (**C-strategists**) develop within low stress, low disturbance, settled environments. Allowed to flourish, competitors endeavour to monopolise resource capture (a thick canopy or even a layer of thatch will limit the availability of resources to other species). They create an environment suitable for their own development at the expense of their neighbours.

Competitors delay seedhead production in favour of producing vegetation and this weakens their ability to withstand disturbed environments. These plants dominate if conditions are settled enough.

### Secondary strategies

Most environments are not so extreme to simply favour the development of **C**, **S** and **R** strategists.

The following diagram describes the secondary strategies that plants may develop to exploit the various intermediate environments. "Intermediate" environments are characterised by lesser intensities of stress, disturbance and competition.

Competitive ruderals (C-R) are adapted to moderate (or infrequent) disturbance (which limits the competition) and low levels of stress. This environment checks competitors but does not eliminate them. Stress-tolerant ruderals (S-R) occur in lightly disturbed, unproductive habitats. Here, the reproductive opportunities are restricted for relatively short periods. Stress-tolerant competitors (C-S) occur in undisturbed environments experiencing only moderate levels of stress to allow the development of some competitive advantage. C-S-R strategists evolve where competition is restricted by only moderate intensities of stress and disturbance. C-S-R strategists are varied in their relative attributes.

### Conclusion to growth strategies

- The environment is governed by the three types of pressure
- Plants have adapted to survive in specific environmental conditions
- The vegetation reflects the nature of the environment
- The grass species present within a green are a reflection of the environment you have helped create

So are we creating the correct environment? Does the greenkeeping favour the desired grass species? If not, can we change the environment to allow the finer grasses to predominate?

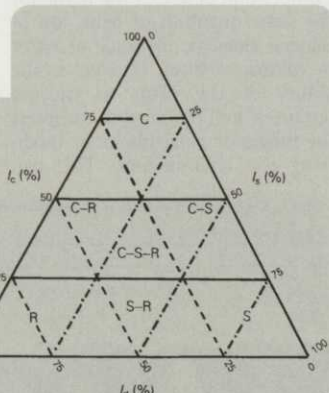


FIGURE 1. A Model describing the various equilibria between competition, stress and disturbance in vegetation and the location of primary and secondary strategies. C, competitor; S, stress-tolerator; R, ruderal; C-R, competitive-ruderal; S-R, stress-tolerant ruderal; C-S, stress-tolerant competitor; C-S-R, 'C-S-R strategist'. Ic, relative importance of competition; Is, relative importance of stress; Id, relative importance of disturbance. (From Comparative Plant Ecology: A Functional Approach to Common British Species, Grime, Hodgson & Hunt, 1988.)

## FEELING THE PRESSURE?

The sward composition of a golf green reflects the pressures being placed upon it. The Head Greenkeeper is in charge of a number of important sources of pressure. Beneficial pressures can be used to manipulate the environment in favour of the more desirable turfgrass species. Poa is favoured by disturbance and, to a large degree, this stems from the pressures

of play, but do not underestimate the influence of your actions. The finer grasses need a more settled environment to take over.

Professor Grime's (and others) work is an educational tool and I hope it gives you a better starting point when formulating your maintenance strategy. Next stop regenerative strategies and successful overseeding.

