

### Biological approach

Following field trials in France Symbio was ready in 1992 to launch its "Biological Approach to Sports Turf Management" with the first version of "Green Circle" – a cocktail of microbes chosen for their ability to:

- Break down cellulose (the main component of thatch) releasing the stored nutrients
- Break down soil organic matter, releasing this nutrient source
- Help supply nutrients to plant roots and
- Compete against and suppress certain disease-causing fungi.

The selected micro-organisms were mixed together with the appropriate starter nutrients and trace elements and were "Biofixed" to protect and enhance their performance in "difficult" environments. Green Circle was originally developed to fit into the greenkeeping scheme of things as outlined in Figure 2.

To follow the diagram began at the bottom. Translate the arrows as "leads to" or "helps with". E.g. increasing soil bacteria and fungi "leads to" reduced dead material, this "leads to" or "helps with" improving root development and increased surface drainage which "help with" improving the playing surface.

The dotted arrows show a kind of "positive feedback" e.g. reducing dead material and "feeding it to the grass", (thereby reducing the requirement for artificial fertiliser inputs) can lead to reduced incidence of disease and therefore reduced fungicide use. Here we have a way of attempting to break the vicious cycle described earlier which can lead to organic matter build-up and fungicide-dependence.

Ongoing product development has produced a range of biofixation products and "bug-boosting" cocktails, and because Symbio was now leading the research and application, manufacturing was moved from France to the UK in February '96.

### An "environmental perspective"

What line of thinking made the original research team come up with the idea for the Biofixation process? It can really be best described as an "environmental perspective".

They looked at the environment that they were putting their "bugs" into, decided what "environmental factors" were making life difficult and tried to minimise their effects by protecting their "bugs".

Of course the way to get the best results is

to improve the environment which you are putting them into as much as possible, e.g. if they need good aeration, try to improve this, if they need certain trace elements, add these, and if certain chemicals which kill them can be avoided, avoid using them or reduce their use, where possible.

Dr Alan Gange's article 'Getting to the Root of the problem' (*Greenkeeper International*, June) highlights research showing mycorrhizal fungal infection of roots appreciably lower on greens than on neighbouring aprons. At one course he also found a bacterial population 1/4000th of that expected on healthy soils.

What are the "environmental factors" in these rootzones which could be responsible for the observed differences? The list could include: compaction and soil porosity; drainage, aeration and moisture levels; levels of organic matter, cation exchange capacity, pH, levels of iron and other metals, levels of sulphur, soil nutrient status, fungicide use, other trace element levels.

Greenkeepers are already looking at these factors in relation to their known direct effects on grass plants, but as we increasingly accept the reliance of healthy plants on a healthy soil full of microbial life, we are increasingly looking at how these factors and others affect the life in the soil (and thus how they indirectly affect the plants).

### Available oxygen

For example adequate aeration is well known to be of crucial importance to both plant roots and beneficial soil micro-organisms.

Take the situation of soft thatchy greens on soil root-zones – drainage is slow and the thatch layer easily becomes saturated with water.

The greenkeeper tailors his cultural practices to give maximum available oxygen in this thatch layer so that aerobic (oxygen-requiring) micro-organisms can break down the thatch.

He wants to avoid allowing the "environmental conditions" to develop where anaerobic bacteria take over. (These bacteria function without oxygen, turning available sulphur into hydrogen sulphide and available nitrogen into nitrite. Both of these compounds are toxic to plant roots and to aerobic bacteria.)

So, in addition to aerating and improving drainage to provide as much oxygen as possible, he must also think carefully before adding substances to this environment

which themselves require oxygen (i.e. reduce its availability) or provide sulphur (e.g. sulphate of iron, most fertilisers and organic feeds).

Clearly these substances are vital to greenkeepers, but all products need to be used at the right time and under the right conditions.

### "You can't fight nature"

Bacteria were among the first living things to colonise the earth, followed not long after by multi cellular fungi. Plants were on the scene long before the very simplest animals.

Ancient associations are often found in nature in which different organisms cooperate to their mutual benefit (a term called Symbiosis). The relationship between some of the fungi and plant roots explained by Dr Gange in June's *Greenkeeper International* can be so close that the fungi themselves are difficult to study in isolation because they are hard to culture away from their "host" plant.

So, over many millions of years of evolution, certain bacteria, fungi and plants have evolved to benefit one another in soils. Any good greenkeeper will tell you that you can't fight nature – h will always win. If you manage your grass and ignore aspects of its nature (such as what is growing all over its roots and in the surrounding soil it inhabits) you will miss something important and nature will make your job more difficult.

■ Guy Longshaw BSc is Technical Manager Sports Turf and Water of Symbio. Tel: 01372 456101 Fax: 01372 456099.



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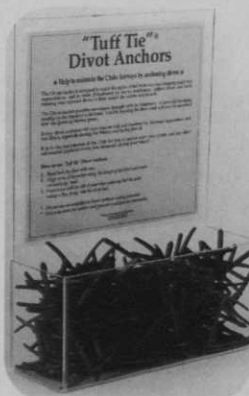
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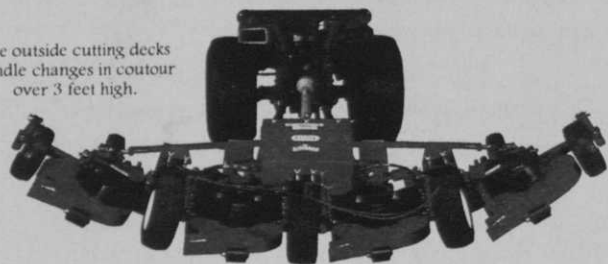


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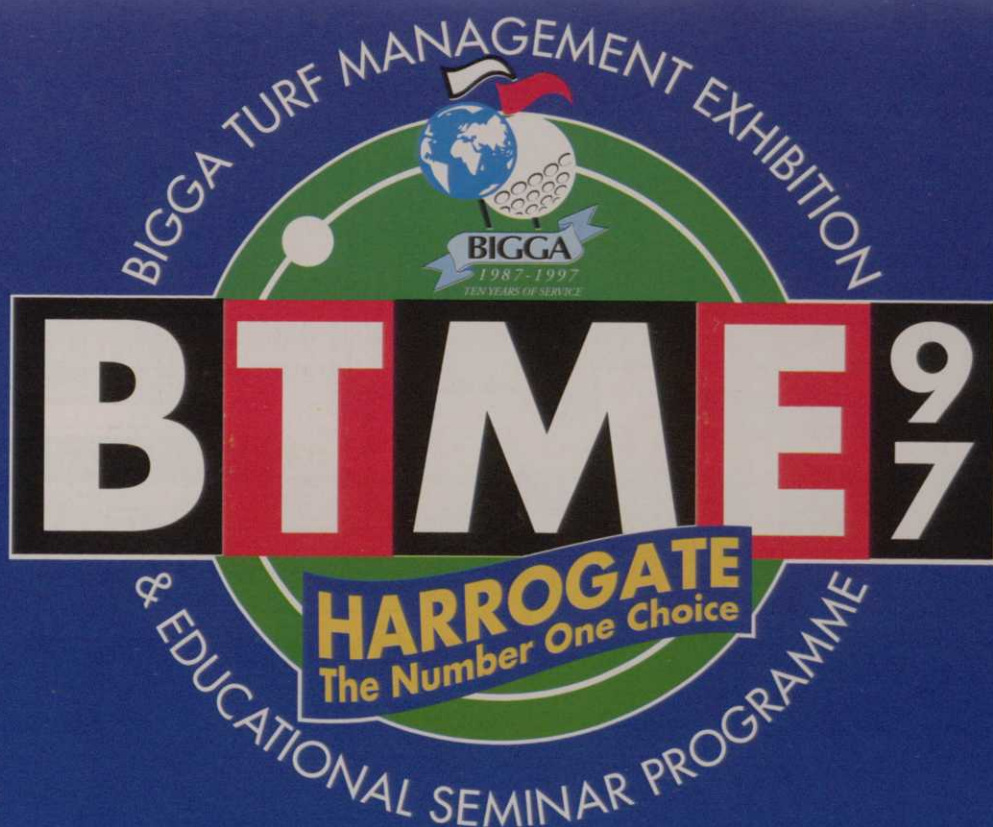
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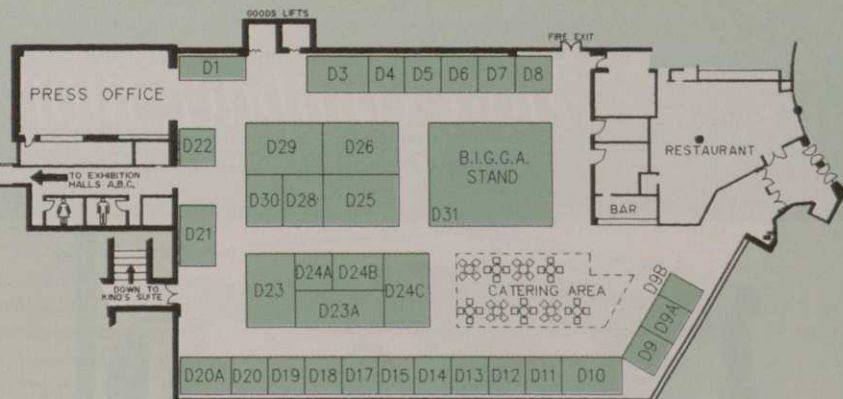
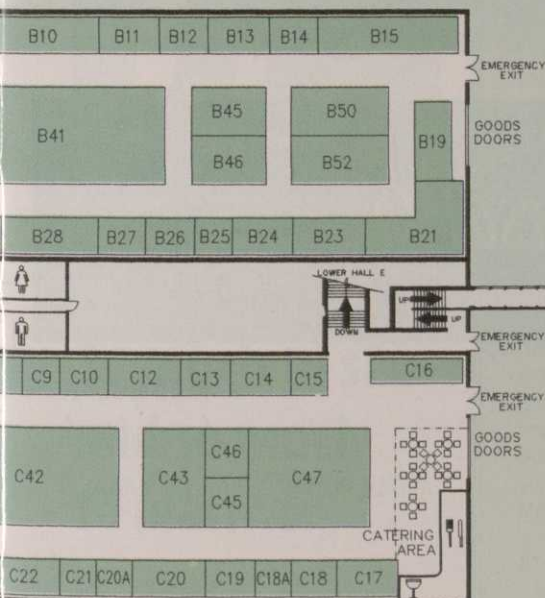


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## So much to see and so much to learn...

On behalf of the British and International Golf Greenkeepers Association it gives me great pleasure to welcome you to the Harrogate International Centre for BTME '97.

As always our aim has been to build on the success of the previous year's show and we feel confident that, whether you are an exhibitor, a greenkeeper, a golf club official or a speaker, your time at BTME '97 will be time well spent.

What pleases us is that news of the success of BTME has reached so far afield that many of our delegates and exhibitors come to Harrogate from outside the United Kingdom.

Our overseas visitors know that when they come to BTME they will enjoy a friendly welcome and learn much to take back home to their own country.

More than ever BTME offers something for everyone.

**DEAN CLEAVER**  
Chairman of BIGGA

# Another record-breaker and a great week ahead

## HIGHLIGHTS

### BIGGA NATIONAL EDUCATION CONFERENCE

Monday 20 and Tuesday 21 January, The Majestic Hotel. Delegates arrive and register at The Majestic Hotel between 4.30 and 6.30pm on Sunday 19 January followed by dinner at 7.30 pm (jacket and tie must be worn). The conference is held over the next two days, when 14 speakers from six different countries will present papers on a variety of topics of interest to all greenkeepers.

### BIGGA WORKSHOPS

Monday 20 and Tuesday 21 January, The Majestic Hotel. Delegates arrive and register at The Majestic between 4.30 and 6.30pm on Sunday 19 January followed by dinner at 7.30pm (jacket and tie must be worn).

Workshop 1 will give delegates experience of designing a golf course complex (sorry, sold out), Workshop 2 will give delegates the skills and knowledge to conduct surveying and levelling procedures, Workshop 3 will cover communication with committees and Workshop 4, a one day workshop, on Tuesday 21 January will cover 'The Magic of Greenkeeping'.

### BTME SEMINAR PROGRAMME

Wednesday 22, Thursday 23 and Friday 24 January, The Kings Suite. Speakers from the USA, Sweden and the UK with subjects from Golf Course Design, Employment Law and the Rules of Golf indicate the range of speakers and subjects at the BTME Seminar Programme, which runs alongside the BIGGA Turf Management Exhibition. The Kings Suite is situated inside the Harrogate International Centre and is approached through Hall D.

### STRI CHAIRMAN OF GREEN/SECRETARIES' COURSE

Tuesday 21 and Wednesday 22 January The Crown Hotel. Delegates arrive and register at The

Crown Hotel between 8.30am and 9.00am on Tuesday 21 January. This course, presented by the Sports Turf Research Institute experts in agronomy, turf grass science, fertilisers and pesticides and a BIGGA Course Manager, introduces chairmen of green and golf club secretaries to the practicalities of golf course construction and management, types of soil, seed, pests, diseases, and pesticide legislation. It also includes a visit to the STRI trial grounds and laboratories and the BTME exhibition.

### FEDERATION OF EUROPEAN GOLF GREENKEEPERS ASSOCIATIONS (FEGGA) ANNUAL GENERAL MEETING

Thursday 23, January, The Majestic Hotel, 12 noon The first FEGGA Annual General Meeting will be held during BTME in the Majestic Hotel.

### BIGGA ANNUAL GENERAL MEETING

Wednesday 22 January, The Majestic Hotel, 5.45pm The BIGGA Annual General Meeting will be held during BTME. Membership cards must be produced to gain admission.

### SOCIAL PROGRAMME

The Exhibition Banquet on Thursday 23 January, at the Majestic Hotel, will be followed by a spectacular cabaret starring Bobby Davro, ably supported by a fabulous female vocalist, Laine Kennedy. The social programme also includes a conference dinner on 20 January with after dinner speaker Professor David Purdie, Dean of the University of Kingston upon Hull and a Karaoke Night on Wednesday 22 January.

### AND TO BOOK...

Any delegate wishing to book hotels, seminar sessions or the banquet should contact Sami Collins, at BIGGA Headquarters Tel: 01347 838581.





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