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From his base near York, Robert Laycock, an independent agronomist, charts the history of the use of acidic compounds on the golf course

THE

THEORY

Greenkeepers have been deliberately acidifying their greens for the last 60 years. Perhaps this is the time to stop. The fairways and rough of golf courses are often rich in fine grasses, but rarely the greens. Driving down the pH has not had the desired effect. It may have worked at first, but in many cases acidification has gone too far.

The history of the Acid Theory

The Acid Theory originated in the 1920s as a result of research work in the USA by Oakley and later at other universities, such as the University of Rhode Island. Broadly speaking, it had the aim of creating the acid conditions which research had shown favoured the desirable fine fescues and browntop bent at the expense of coarse grass and broad-leaved weeds. This was achieved largely through the use of sulphate of ammonia.

Apparently the theory as practised came about as a misunderstanding of Oakley's research. Oakley had established his experimental turf from seed and kept it clear of weeds by the use of acidifying materials. He did not start with weedy turf and then rid it of weeds as was attempted by greenkeepers subsequently.

In the UK the Acid Theory appealed because it simulated the acid soils where the fine fescues and bents of acid heathland golf courses could thrive. The acid conditions also worked against the needs of certain weeds (remember this was before the invention of selective hormone herbicides, which first became available in the late 1940s). It was also before the days of pop-up sprinklers and the overwatering which they all too often brought.

The acceptance of the theory was widespread. In certain cases it was

very successful. I G Lewis, writing in his book 'Turf' in 1948, stated that the Acid Theory:

"...left in its wake hundreds of ...golf greens infinitely better than before while causing severe damage to others." (My italics).

(It is interesting to note that I G Lewis was one of the first agronomists to leave Bingley to set up his own independent turf advisory service, in the 1930s.)

In 1931, Beale wrote:

"There are fashions in fertilisers as with everything else, the latest being the "acidity theory" which is so American that one feels almost compelled to spell sulphate sulfate as they do.

... In brief the theory is this: it is claimed that if turf is dressed exclusively with sulphate of ammonia in conjunction with neutral compost, free of lime, once a month from March to October, both inclusive for five years, the soil in most cases

Are you missing?

Driving down the pH has not had the desired effect. It may have worked at first, but in many cases acidification has gone too far.

The rain in the UK is naturally acid, so there is a tendency for golf green soils to become more acid over time. Will there come a time when they become too acid for healthy plant growth?

will be rendered sufficiently acid as to exclude the growth of all weeds and coarse grasses and promote solely the growth of the very finest grasses..."

There was a backlash against the theory (which had been overdone in the 1930s) and the very low pH values which were caused had to be corrected by liming in some cases.

A J MacSelf wrote about the heyday of the Acid Theory:

"Any remark made which implied doubt [of the soundness of the Acid Theory] was attributed to stubborn prejudice and foolish adherence to old-fashioned and unscientific ideas."

Observations on golf green turf

We see few broad-leaved weeds on old golf greens. However, if the Acid Theory really worked we would expect to find that golf greens on acid soils are composed solely of fescues and bents. The only fescues which I see on the soil based greens of old inland courses are from recent overseeding or, in a very few cases, where they have managed to hold on against the odds. Bent is more common, but rarely manages to occupy more than a small percentage of the area of a green. The annual meadow grass which the technique is intended to oust is always the dominant species. Perennial ryegrass is also commonly found.

Many of the old greens I come across have a turf consisting pre-

dominantly of annual meadow grass on soils of pH 4 to over 7. In other words the annual meadow grass seems to do better than the bent and fescues at all pH levels. In other words the Acid Theory does not work.

The effects of repeated acidification can be seen in many of our old golf courses. Earlier this year I received soil samples from the greens of a well known golf course (not a regular client). The pH values were between 4.4 and 4.8. The turf was annual meadow grass, the rootzone anaerobic and thatchy. Experience has taught me that a factor in the development of greens like this is the use of acidifying materials. My recommendation was that the greens should be limed - I do not expect for one moment that they will be. But what would be the adverse effect of liming greens like this? What could be worse than their current condition?

Using lime on golf greens

I do not often advise the application of lime to golf greens, but in some cases it is necessary to correct the effects of years of over-acidifying. In these cases the benefits of lime are significant. Greenkeepers are often shy of using lime.

There is a widespread view that lime is harmful to golf greens. What about earthworms? If we let the soil pH rise won't there be worm problems? Clearly there is a danger in this, particularly if lime is used to excess. However, in my

experience, the increase in worm numbers is small if advice from a qualified agronomist is followed carefully. It is less likely to happen when starting from a very low pH.

What about fusarium patch disease? Won't that be worse if lime is applied? Again, my experience is that the turf on very acidic greens is less prone to fusarium after liming. In one case the two greens which were limed had no fusarium while the rest of the greens on the course did. My explanation for this would be that the calcium in lime is an important component of the cell walls of the turfgrasses, and plants need it to reduce the likelihood of infection.

Management

There comes a time when everyone should ask themselves: "What are the problems on our greens? What is causing them and what can we do to put them right? Are they the same as ten years ago? If not should we change our management policy?"

It is very easy to get into a rut and apply the same management programme to the golf greens this year as last year. This approach assumes that there are no long-term cumulative effects of the management programme. In the case of Acidity Theory - what are the long term effects of constantly acidifying the soil? The rain in the UK is naturally acid, though not so much as it was before the Clean Air Act, and so there is a tendency for golf

There is a widespread view that lime is harmful to golf greens. What about earth-worms? If we let the soil pH rise won't there be worm problems?

green soils to become more acid over time. Will there come a time when they become too acid for healthy plant growth?

Many plants are quite specific about the conditions they like. Not so annual meadow grass. It will survive at all levels of acidity. Why is this? The reason is that it is not just acidity that affects annual meadow grass survival. It is the over-watering, incorrect feeding and poor drainage of too many golf greens that make annual meadow grass the best adapted grass for golf greens, whatever their pH.

Some of the best old fescue-bent greens occur on links courses where the pH may be over 7 due to the sea shell content of the sand on which they are built. Why are these greens not full of annual meadow grass? One of my clients has greens of this type but on one of the 18 there is a significant annual meadow grass content. It is no coincidence that this is the only green on the course with pop-up irrigation. This leads me to conclude that it is over watering, not acidity, which is the main factor in encouraging annual meadow grass on the golf course.

Worse than the use of ammonium sulphate, which with iron sulphate is the usual acidifying material, there are some disreputable individuals who promote the use of granular sulphur, getting repeat orders by checking pH on a deep soil sample and ignoring the fact that the surface of the soil is

extremely acid. Since this is where the turf has most of its roots, it inevitably suffers. Each time the sulphur is applied it lingers in the soil, acidifying it over a very long time. Remember when using sulphur that the chemical reaction which occurs in the soil produces sulphuric acid, the effects of which on plant material we know from our school science lessons.

There are dangers from using any material as powerful as sulphur or lime to excess. If you intend to use them be careful and understand exactly what you are doing. Use moderation in all things. Use sulphur. Use lime. But only do it when you know exactly what you are doing or have an independent advisor who you can trust.

Robert Laycock has worked in turf research and agronomy since gaining an MSc from Imperial College, London, in 1974.

Following six years of research at STRI, his career has included periods involved with turfgrass breeding and grass seed production, as well as the production of cultivated turf and golf course management and agronomy. He now practices as an independent agronomist from his base near York, advising golf courses of all types around the UK.

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Welcome to the inaugural BIGGA workwear and casual clothing range. Late last year, BIGGA and Stylo joined forces to bring you this exciting range of clothing and footwear for 1999.

Included in the range is the first ever BIGGA approved golf shoe, the Duo - a technologically advanced shoe designed to provide the ultimate combination of on-course comfort and functionality. This shoe accommodates both softspikes or traditional spikes - both with the revolutionary quick-fit Q-Lok system.

All the clothing featured here is manufactured to the highest specifications in durable materials - offering working comfort as well as practicability. All items subtly feature the BIGGA logo.

While all the garments and footwear featured represent exceptional value for money - they have also been designed to be practical and stylish for general leisure as well as for work use.



THE BIGGA COLLECTION

GENERAL WORK & LEISURE WEAR

1

Lister Knitshirt

A classical cotton interlock short sleeved shirt with a jacquard design on collar and cuffs.
BKSH 961 Nvy Navy £17.95
BKSH 961 Wht White £17.95
Sizes S, M, L, XL, XXL

2

Thornproof Gloves

These offer a special covering that protects against thorns and brambles.
BGT 107 GRN Green £2.25
One size fits all

Pimple Palm Gloves

These gloves are pimpled on the palm to provide extra grip.
BGP 108 GRN Green £2.25
One size fits all

3

Sweatshirt

Plain, quality cotton sweatshirt with BIGGA logo.
SWT 105 Nvy Navy £13.49
Sizes M, L, XL

4

Basket Weave Slipover

A practical cotton and acrylic basket weave slipover.
BSWS 550 BLK Black £22.95
BSWS 550 Nvy Navy £22.95
BSWS 550 BTL Bottle £22.92
Sizes M, L, XL

Owen Knitshirt

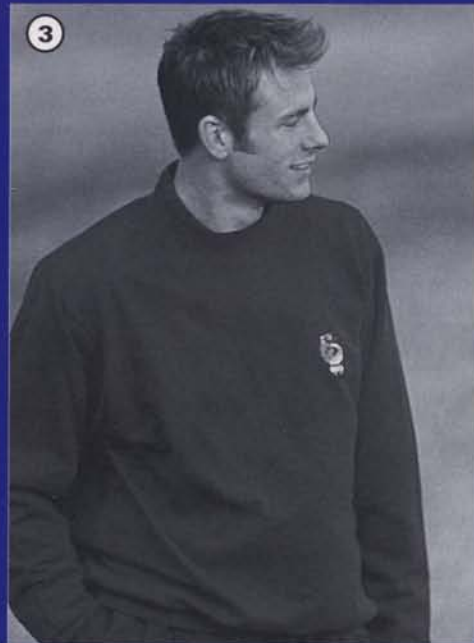
This is a plain coloured polyester/cotton short sleeve shirt. It has a flat knit colour and features the BIGGA logo.
BKSH 910 BTL Bottle £14.95
BKSH 910 NAV Navy £14.95
Sizes M, L, XL

Trousers

Poly/cotton trousers with 2 side slant pockets and 2 rear pockets.
TRS 104 Nvy Navy £17.95 (reg leg)
TRS 105 Nvy Navy £17.95 (long leg)
Sizes 32, 34, 36, 38, 40, 42

Full Zip Fleece

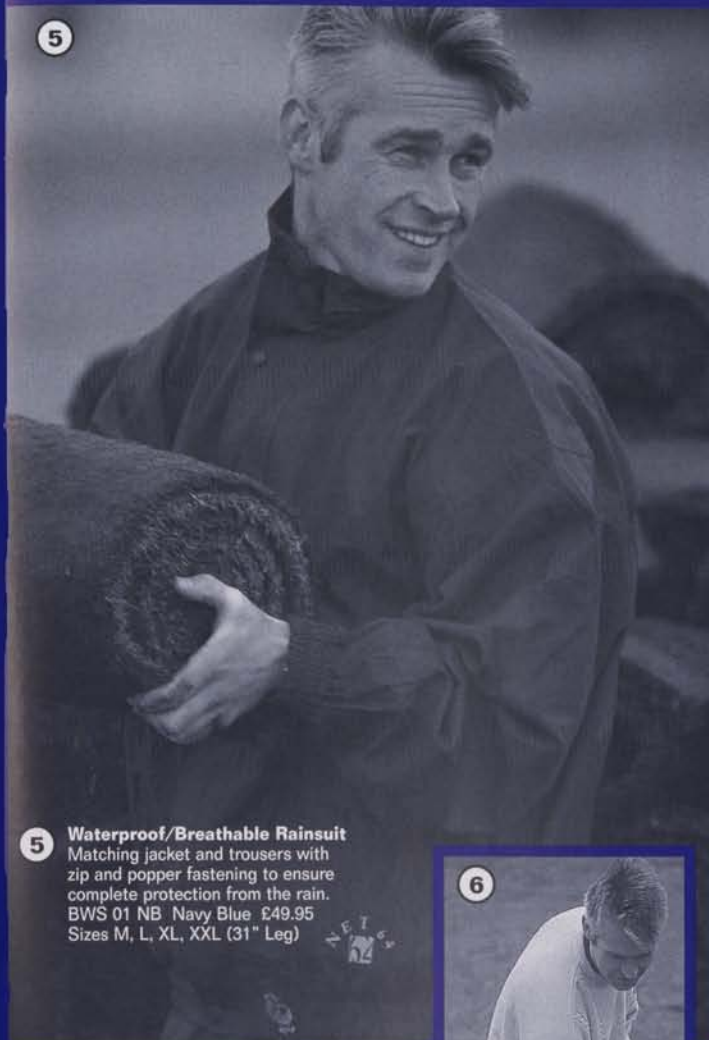
This fleece top is made from Teflon material, which ensures that rain will 'run-off' the garment, making it quick drying and very practical. It comes in navy with a contrasting collar.
BFLC 500 Nvy Navy £29.95
Sizes M, L, XL



RAINWEAR

WORKING SHOES & BOOTS

5



5 Waterproof/Breathable Rainsuit

Matching jacket and trousers with zip and popper fastening to ensure complete protection from the rain.
BWS 01 NB Navy Blue £49.95
Sizes M, L, XL, XXL (31" Leg)

6



6 Fairfield III

Stylo has produced its own Iso-thermal system sweaters to protect you from the worst elements. The membrane system is ultra thin yet provides full waterproof protection and is completely breathable. The Fairfield III is a transfer cable and argyle patterned sweater which is made from a wool/acrylic twist yarn.
BSWT 375 CRM Cream £49.95
BSWT 375 NVY Navy £49.95
Sizes X, M, L, XL, XXL

Waterproof Trousers

Practical, extra-strength, multi-use trousers.
WPT 102 GRN Green £10.95
Sizes M(34), L(36), XL(38)



7

7 Duo Golf Shoe

Incorporating a technically designed hard-wearing rubber outsole which is suitable for both conventional and alternative spikes. Each pair of Duo comes with conventional spikes fitted and a separate pack of alternative spikes. The shoe utilizes an Iso-Thermal weatherproof membrane system, developed especially for its waterproof and breathing qualities.

MG 486 BBU Men's Black/Burgundy £41.95
MG 487 WNY Men's White/Navy £41.95
LG 833 WBG Women's White/Beige £41.95
LG 834 WBU Women's White Burgundy £41.95
Men's sizes 6-11 including half sizes and 12
Women's sizes 3-8 including half sizes

8

8

8 Safemasta Steel Toe Capped Wellington Boot

Durable all-purpose Wellington with thick moulded sole and heel grip for easy removal.
SFT 01 BK Black £18.95
Sizes 5-11 plus half sizes 6 1/2 and 9 1/2

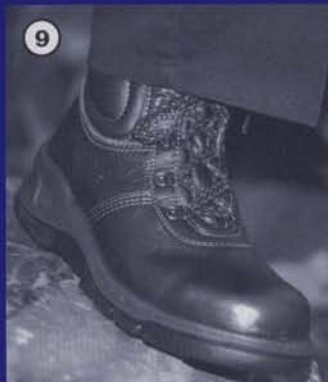


9

9 Stavanga Steel Toe Capped Ankle Boot

Tough, comfortable workboot with padded ankle protection and extra grip. Contoured high-grip sole.
STV 01 BK Black £49.95
Sizes 5-12 plus half sizes 6 1/2 and 9 1/2

9



THE BIGGA COLLECTION

To purchase merchandise from the 1999 BIGGA collection, simply indicate which products you require in what quantities and sizes, using the order form printed here.

(You may photocopy this form to avoid cutting your Greenkeeper International)

All prices shown are inclusive of VAT. Orders under £200.00 will incur an additional £4.00 postage and packing supplement. After completing your order details, next complete your name and address details, and return this form with your VISA details or cheque (made payable to BIGGA) for the full amount (inc postage and packing)

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Education opportunities

With the appointment in 1989 of an Education Officer, BIGGA took an important step forward in its commitment to improving the training and education of greenkeepers in the profession and today offers a wide and varied range of opportunities to its members.

All members have access to the National Education Conference, 'in house' supervisory management courses, short regional based specialist and management courses, careers advice, a lending library, the Master Greenkeeper Certificate Scheme as well as videos, books and education related competitions.



Education & Development Fund

Closely linked to BIGGA's education policy is the Education & Development Fund which was established in 1992 with the creation of the Golden and Silver Key sponsorship scheme. The sole aim of this Fund is to enable the promotion and financing of specialist educational programmes and training aids for the benefit of the greenkeeping profession.

Between 1992 and 1997 the Fund helped BIGGA produce three training videos (Golf Green Reconstruction, Golf Course Preparation and Golf Course Ecology) and one book (A Practical Guide to the Ecological Management of the Golf Course), plus several field guides including the identification of grasses, the identification of trees and shrubs and the control of mammals. The Education & Development Fund has also been used to help subsidise regional based management courses for the benefit of members.



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For more information about BIGGA's education and training opportunities available to you, contact Ken Richardson, Education and Training Manager, or Sami Collins, Education and Training Assistant on 01347 833800.

BIGGA's latest Golden Key company, Amenity Technology, has quickly become a recognisable name within the industry thanks to a combination of inspiration and perspiration. Scott MacCallum travelled to Reading to meet the team.

Growth industry



Gary Haines,
Stuart Ashworth,
Carl Crome and
Alex Wright



In terms of change there can be few equivalent industries to match fine turf over the last few years.

Keeping up with the growth and, more importantly, increasing levels of sophistication takes commitment, imagination, not to mention sheer hard work, but as Amenity Technology, BIGGA's latest Golden Key member, has proved the rewards are there.

The company started small in 1993, with just one man armed with a good idea, but it has grown out of all proportion to the extent that it

has recently moved into new premises in Reading, the fourth move in six years of trading; has 12 full time members of staff and an attractive set of product ranges packed with items which are becoming more and more popular with greenkeepers.

That original idea was to bring unique products into the market place and the key was to choose a time when the industry was ready for such a change.

"I saw niche market emerging because there was a lot of new golf club development at the time and

the demand for courses to sell themselves, and pay more attention to the cosmetics and presentation, was becoming much greater," said Managing Director, Carl Crome.

Having the idea is one thing but putting it into practice is quite another but Carl built solid foundations for the fledgling company by spending valuable time and effort researching his potential product base in the country which leads the way in such things - the USA.

"America has far outgrown us with 22,000 golf courses and still growing



An unusual addition to the office!

and so with much greater competition they had to learn to sell themselves and products have been developed which were perhaps five to ten years ahead of the UK," explained Carl.

He spent a number of months sourcing new products from America which were unavailable in the UK market.

"I brought these specialist products over to Britain and marketed them out through a distributor network. There was no-one else at the time doing the same thing."

It is a measure of the success the company has subsequently enjoyed, and Carl's ability to spot talent among the thousands of products available Stateside, that many are now established as key weapons in a British greenkeeper's armoury.

"Many of the products we brought over initially were thought of as no more than gimmicks and it is satisfying to see them now so well established."

Initially Amenity Technology's market tended to be clubs at the upper end of the game but this has now filtered down to the more regular members' clubs. The question of whether this has been caused by the golfers demand for a higher standard of golf course, or that education is reaching the level that greenkeepers are demanding better quality products elicits an answer from Carl of "Both".

"The education of the greenkeeper now is just streets ahead of where it was even five years ago but the golfer is also much more demanding."

Amenity Technology now concentrates its efforts on five product ranges and within these its own Research and Development division has introduced several own-brand products.

"When it comes to our own development we always try to avoid 'Me Too' products," said Stuart Ashworth, the company's Technical Director and a qualified soil scientist.

"Instead we try to come up with something which is better, more environmentally sound; better researched and with better back-up. In other words we are always trying to

improve on the quality of the products that are out there rather than coming up with another 8-0-0. We want to be one step ahead."

An area where much development is expected over the next few years is bio technology and Amenity Technology is making sure it can meet customer needs in that regard.

"People are becoming much more aware of the environment. There is always news about, whether it be genetically modified food, global warming or that having a 1.1 litre car will reduce your road tax and this rubs off at work too and we're thinking about how we can help the environment," said Stuart.

"One of our main fertiliser ranges is based on turkey manure so again we're turning one man's waste into another man's useful product. We are trying to cater for that need by providing environmentally sound products that can be used for a sustainable resource," he added.

The desire to avoid the "same again" mentality also goes for the imported products where the team can look at 100 products and end up only bringing one of them on board... if that.

"There has been real change in the last couple of years. Previously we would approach potential suppliers but now we are approached regularly by companies who want us to be their distributors. They have heard what we have done for other large name American suppliers like The Andersons and realise the potential we could offer them," said Carl.

"But we are limited by whether the potential product fits into our portfolio and has sufficient research and trial data to backup the suppliers claims," he added.

The company has an open management structure with regular meetings where all members are able to put forward their point of view.

"We have a very relaxed approach and hope that comes across to our customers," said Carl, and the easy banter within the team itself is proof of that approach.

They use a distributor network, which stretches the length and breadth of the country to reach their customers.

"We want greenkeepers to be able to deal with their local distributor so they can talk easily about our products, and receive high levels of service," said Sales Director, Gary Haines.

To keep the distributors up to speed on what are often highly advanced, technical products regu-

lar presentations are held to provide product information on the latest releases while Amenity Technology staff will often accompany distributors on greenkeeper visits or make visits themselves to learn what the end-user thinks about products or wants from future developments.

As well as developing its five product ranges Amenity Technology has made a conscious decision to raise the profile of the company recently.

"I don't think there can be many greenkeepers now who haven't heard of Amenity Technology," said Sales and Marketing Co-ordinator, Alex Wright, who charts this change over the last two and a half years.

"BIGGA has helped us in this regard as we have done a great deal of advertising in Greenkeeper International while BTME is also a superb opportunity for us to get to know our customers."

During Harrogate week Amenity Technology hosted a reception for up to 450 in the Old Swan Hotel. It is a friendly hands-on approach that has been well received by the nation's greenkeepers and is one which is now being taken beyond these shores. The team also understands that a selling job often has to be done to the committee, members and people who just play the course as well as the Course Manager or Head Greenkeeper.

"Often a product is bought by a club because it answers the demands that the club golfers have whether it be green indicator dye or colourant for lakes. If the membership is happy the greenkeepers job is much easier," said Gary.

"We are now moving into Europe and are doing particularly well throughout the EEC"

The decision to formalise the relationship between the company and BIGGA was taken through a genuine desire to make a contribution to greenkeeper education. "As I said earlier much of our success is based on our products being taken on by knowledgeable greenkeepers and anything we can do to assist with greenkeeper education obviously helps us as well as the profession," explained Carl.

While impressive, the growth and expansion of Amenity Technology over the last six years has been achieved in a measured fashion and feet have stayed very firmly on the ground.

"We have a long term strategy for Amenity Technology and that involves doing things the right way. We believe we do that," concluded Carl.



- The fertilisers include The Andersons and The Sustane ranges from America

- The golf equipment and accessories come from the Bayco range

- The Water Management range includes Crystal Clear, biological algae control and lake clarifier

- The Biotech range includes root enhancers and disease suppressants

- The wetting agents which include the new Drencher range