BIOSTIMULANTS is biological but is directed against malign microbes and not via the plant’s metabolism, and therefore not the action of a biostimulant. But chemicals in compost tea which can enter plant to deliver a direct growth response will satisfy the criteria of a biostimulant. Compost tea contains humic substances, a general name covering a wide range of chemicals, such as fulvic acids, with their origins in the decomposition of plant and animal matter into humus. Larger humate molecules play an important role in soil crumb formation, an important property and function but not those of a true biostimulant. On the other hand, small molecules like humic acids and fulvic acids are thought to be vehicles and carriers of essential plant nutrients into the roots and as such are model biostimulants. Classic example is biostimulants applied in the run-up to winter, to enhance the availability and utilisation of tissue strengthening nutrients like potassium and calcium and the ‘greening’ benefits of iron.

Setting boundaries for biostimulants

In the absence of any formal boundaries the following is my take on the status of several key groups of factors which appear to be key and central to the biostimulant debate.

Plant hormones

Plant hormones immediately spring to mind when canvassing for the biostimulant or its ‘bio’ and ‘stimulation’ components. Plant hormones are used in agriculture and horticulture as plant growth regulators, targeted at plant development – fruiting, flowering and bulb initiation. But that dimension doesn’t apply to turf grasses which are not expected to or required to flower and set seed.

Plants generally contain optimum concentrations of individual plant hormones which are in balance. Any turf treatment which pushes a plant hormone over its correct level could have an over-stimulatory effect. This may occur through direct effect of the hormone on its target and function (e.g. promotion of cell division or cell elongation), or an indirect effect due to creation of imbalance with other plant hormones. Even under normal conditions a plant is not all things to all plant organs. Natural plant auxins stimulate growth of stems and shoots but at the same concentration will inhibit root growth.

Perhaps more pertinent and practical is the effect of environmental conditions on the production and behaviour of natural plant hormones. For instance, production of cytokinin in roots and its transport to shoots is known to be inhibited by flooding, drought and high temperature. Provided other hormones are maintained at correct levels, turf stressed by these factors could benefit from cytokinin treatments. In this case any positive response would qualify as biostimulation.

Clouding the issue is North American research showing effects obtained may depend on turf grass species. Application of gibberellic acid to Bermuda grass (Cynodon dactylon) swards during cool fall (autumn) conditions provided a
very positive growth effect, although the same treatment applied to St Augustine grass (Stenotaphrum secundatum) under identical conditions had a negative and even toxic effect.

**‘Friendly’ fungi and bacteria**

Should any living organism claiming to boost and benefit grass growth be called a biostimulant? That will depend on whether action is direct (i.e. via the grass plant metabolism) or indirect, e.g. through the suppression of other potentially pathogenic microbes. Trichoderma fungi may act antagonise Microdochium nivale (causal pathogens of Fusarium patch) to suppress the disease but are not acting directly through the plant.

Nitrogen fixing bacteria (Rhizobium) colonising clover roots conform more closely to a biostimulant model. By the same token mycorrhizal fungi in association with grass roots and especially endomycorrhizal fungi are biostimulants.

Clovers are important beneficial components of agricultural grass swards but overall effect on turf is negative. Biostimulation of white clover (Trifolium repens) or bird’s foot trefoil (Lotus corniculatus) prostrate, creeping and damaging weeds of professional turf, particularly during periods of moisture stress, far outweighs any marginal benefits of nitrogen containing compounds ‘leaking’ into the root zone or nitrate becoming available when clover plant material decomposes in situ.

**Pesticide turned biostimulant**

Pesticide compendiums are perhaps the last place you would look for a biostimulant but tucked away in the many thousands of commercial products developed over the last half century is at least one fungicide which clearly has biostimulant properties and model ones too.

Fosetyl-aluminium described as a phosphonate (a derivative of phosphorous acid) and discovered in the 1970’s was developed as a foliar applied systemically acting fungicide to specifically control Oomycete fungi like Phytophthora and Pythium. These highly aggressive plant pathogens have since been grouped with the algae and are re-branded as fungus-like pathogens.

Fosetyl-aluminium caused confusion from the start because it provided excellent control of some species (e.g. Phytophthora fragariae causing red core of strawberry) but did virtually nothing against others such as Phytophthora infestans the causal pathogen of late blight of potato.

Scientists eventually discovered that fosetyl-aluminium was not a classic fungicide acting entirely and directly against the pathogen. A significant part of its perceived ‘fungicidal’ activity was achieved by triggering an anti-fungal response in the plant host tissues.

On this basis fosetyl-aluminium has ‘5-star’ biostimulant status, even though commercial products containing the active ingredient have approval for use as fungicides and are described as such. There is nothing ‘cut and dried’ or ‘black and white’ about biostimulants.

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**Quiz:** goo.gl/RPpDN4
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Win an iPad

How you can win an iPad in our revamped Photography Competition

BIGGA members can win an iPad in this year’s Photographic Competition – and for the first time you can submit smartphone images.

Many BIGGA members take stunning course photos on their mobiles – and these entries are now encouraged as we move to producing a desktop calendar for the first time.

We’ll also be giving members the chance to pick the winners. A panel at BIGGA House will whittle the entries down to the best 24, then you will be able to pick your favourite through a survey on our website. The 12 leading entries will be included in the calendar and the winning image overall will win an iPad, plus a large framed version of their image.

We continue to welcome photos taken on digital cameras. The images will be displayed at a 16:9 ratio. If you are taking your shot on a mobile phone, please ensure it’s taken on the highest resolution setting possible.

To enter, please send your images to comps@bigga.co.uk with ‘BIGGA Photo Comp 2014’ in the subject field. Please include your name, the club you work at and your membership number. Also, please state which course your photo was taken at to allow your picture to be considered. Entries are limited at five per person. The closing date for entries is Friday 18 July 2014.
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Do we value the importance of cutting unit adjustment as much as we should? Or put another way: as greenkeepers, how much of our time is dedicated to the cutting units?

I want to examine just a few of the many variables that need to be considered when talking about precision engineering like modern cutting units and achieving the single, greatest impact on how a golf course looks and plays.

The weather appeared so predictable, with four seasons, warm summers and cold winters. Heights of cut were more predictable, one height in the summer, one in winter and never the twain should meet. Whatever your views on climate change, weather patterns are changing, which means we in turn need to adapt to our ever-changing environment.

Another big change is raised confidence, from the Seventies to the Eighties, when I started my journey in this industry, the view that mower set-up and maintenance has the single, greatest impact on how a golf course looks and plays.

So how do we meet these expectations? Do we value the importance in cutting unit adjustment to help us achieve these expectations?

It is my belief consistent and proper mower set-up and maintenance has the single, greatest impact on how a golf course looks and plays.

We work with so many variables, which alter from machine to machine, location to location, day to day and so on. We therefore need to be able to understand and react to these variables.

Although mower technology has moved on dramatically over the past 100 years, the principles of a cylinder contacting a bedknife remains the same since Edwin Beard Budding produced the first mower. These very same principles still rely on a sharp, well-maintained and correctly adjusted unit.

It’s also important to consider that poor maintenance and incorrect set-up may impact on a number of other turf operations we carry out to maintain the playing surface.

In some cases poorly set up and maintained cutting units may lead to damage to the turf. This in turn will mean the turf becomes susceptible to disease.

The result is a need for additional chemical application, fertilisation, scarifying, core and top dressing, all of which comes at an additional cost in time and materials.

As well as good unit and machine maintenance, it is also important to remember turf conditions. Mowing equipment cannot remedy a turf condition.
Cutting edge

Ian Sumpter, Toro’s European Training Manager, explores setting up a mower and asks: how crucial is cutting unit adjustment? He puts forward the view that mower set-up and maintenance has the single, greatest impact on how a golf course looks and plays.

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Another big change is raised expectations – from everybody! In the Seventies, by mid season, football pitches even in the top flight clubs would feature bare mud in high traffic areas, something totally unacceptable today. Now we see training academies with multiple pitches that are manicured to the highest standards – an example of how demands are high on groundsman and greenkeepers alike.

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As well as good unit and machine maintenance, it is also important to remember turf conditions. Mowing equipment cannot remedy a turf condition that has already occurred.

I want to examine just a few of the many variables that need to be considered when talking about precision engineering like modern cutting units and achieving the single, greatest impact on how a golf course looks and plays.

• Check for any unit compensation spring and that they are set correctly. If working with Toro fairway units, tighten the hex nuts on the front end of the spring rod until the compressed length of the spring is 12.7 cm on Reelmaster 5410, 5.5 inch cutting units or 15.9 cm on Reelmaster 5510 & 5610, 7 inch cutting units. All units need to be set the same.

• On the Toro RM5010 Series units check the R clip is located in last hole to allow the spring to move freely. The forward hole is used for removal of the unit and will keep the spring depressed (raising the unit easier to fit back onto the swing arm).

• Check lift arm counterbalance spring setting to increase or decrease counterbalance on the cutting unit. Each setting on the RM5010 Series adds or subtracts 2.3kg to the units.

• Check for wear limits of the reel by measuring from the spindle to the outside of the reel. Manufacturers will list wear diameters and recommended replacement diameter.

• Ensure units are sharp with no visible damage to the bedknife or cylinder.

• Check the unit is on cut, Toro recommends light contact, pinch paper one way cut paper the other. Do not be tempted to tighten the bedknife to reel, adjusting at the slightest hint of a poor cut is a standard error and will not solve the issue and could lead to further problems.

• Grease all grease points being careful not to over grease and wipe away excess grease.

• Finally check height of cut is the same on all units.
The solution to achieving a good quality playing surface with good aftercut appearance is maintaining the partnership between the turf and the machine. The machine needs to be adjusted so that turf and machine can work together.

Before we get onto the turf, we need to consider what roller or bedknife to choose. Rollers such as Wiehle rollers give less support than a full roller and allow the unit to work more aggressively. This will help the bedknife gather and push the grass plant into the path of the reel blade. However in certain turf or in certain weather conditions we may need to give the front of the unit more support. Solid rollers could be an option although this can cause stragglers as the grass is pushed down and passes under the bedknife rather than being gathered up into the path of the blade. In these cases an option is to use shouldered Wiehle rollers or inserts to achieve the same additional support, which can be removed easily when not required.

Once we have the correct roller we need to consider the choice of bedknife, which is dependent on the height of cut we want to achieve. As an example, a Toro Greens DPA unit with a standard bedknife will allow us to cut down to an effective height of cut of 3.2mm. If the height of cut is likely to go below 3.2mm we would need to consider a micro-cut bedknife. The use of a micro-cut bedknife gives us the potential to go down to as low as 1.6mm (although I don’t recommend this as the norm).

Different manufacturers have best set-up practice for their own cutting units and additional set-up such as making sure rollers are parallel.

With Toro DPA units it may be necessary to reposition the spacers on the front roller to maintain the recommended bedknife attitude. It’s always recommended that you familiarise yourself with the manufacturer’s information relating to unit set-up, which can be found in the operator’s manual or service manual.

We know why the attitude/aggressiveness of the bedknife is important to the mowing operation, gathering the turf and placing it into the path of the blade. But when was the last time your bedknife attitude was checked? Are all three, five or seven units the same attitude?

Have you altered the height of cut and not checked what has happened to the bedknife aggressiveness? You can easily check the angle of the bedknife by using a protractor on a straight rule across both rollers, then on the bedknife. Take the first measurement away from the second to give you the angle.

When you have chosen the correct machine with the correct cutting unit configuration for your turf conditions, including number of blades, rollers and bedknife, it is important to think about ongoing maintenance of your cutting units. Of course this only scratches the surface of correct unit set-up.

It does not address the many variables that are involved in machinery set-up to correct quality-of-cut issues. If you’re not already doing so, this article gives you some ideas of what to check when setting up your cutting units.

Many of the main turf industry manufacturers deliver comprehensive training on this subject. For further information contact your representative, whether they are manufacturing grinders and associated equipment, or Turfcare machinery supplier.

To learn more about Turfcare machinery supplier, please visit www.mantis-dealer.co.uk, golf@mantis-uk.co.uk or Schiller Grounds Care 0800 840 0888.
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Different manufacturers have recommended bedknife attitude. The Toro European training manager EMEA. In 2011 The Toro Company employed him as trainer and later service manager and later service for the UK & Ireland, as Turfcare machinery supplier. Many of the main turf industry manufacturers deliver comprehensive training on this subject. For further information contact their Turf division training manager.

As agronomy, weight of units and cutting units and additional set-up variables that are involved in cutting unit configuration for your own mowers are more aggressive as weather. Additionally some hand maintenance of your cutting units. It does not address the many factors that are involved in setting up your cutting units. The difference between bench set second to give you the angle. Of course this only scratches the surface of correct unit set-up. It's used by greenkeepers to resolve bunker problems, saving time and money. With a more powerful 35cc 4-stroke Subaru engine, spinning spring tines at 200rpm, it lifts and aerates the sand to get bunkers back into shape fast and with minimum effort.
Changing times

Peter Billings has been a Course Manager at The Nottinghamshire for many years but has a rather unique experience of having worked for four different owners. Laurence Pithie met up with Peter to gain an insight into what these changes have meant to members, and the greenkeeping team.

Peter Billings, whose father was Head Greenkeeper at Chevin GC in Derbyshire, had a keen interest in golf from an early age. He was Head Greenkeeper at Ruddington Grange GC by the tender age of 21 and played golf to a handicap of six. His skills soon gained the attention of the new owners of nearby Cotgrave Place (as it was formerly known) six miles east of Nottingham city centre.

Peter was offered the opportunity in 1989 to finalise the construction, grow-in and then manage this 27 hole parkland course which opened for play two years later. He held this position until 2005, working under the ownership of American Golf (AG-UK) from 1996.

During this time, the club was extended to 36 holes, giving members the choice of two first class golf courses. After a three year spell in property development, Peter returned to Cotgrave Place in 2008 as Course Manager. By then, Crown Golf were the third new owners, having acquired the course from AG-UK.

In 2010, the club was again sold, this time to a 'local' business consortium before being bought out by the present owner, Alan Hardy, a year later.

During this time the club was renamed The Nottinghamshire and has undergone numerous changes both on and off the course. In his 22 year tenure as Course Manager, Peter has worked at the same course, but under four different owners, each with differing objectives.

A major step forward

Although each change of ownership ran relatively smoothly, they were worrying times for employees as job security can never be guaranteed.

Since around 40% of golf courses within the UK are 'commercially' owned, the buying and selling of golf clubs is becoming more common. To find out more I asked Peter for his thoughts on these periods of uncertainty and how he managed these changes.

"The lead up to the first change early in 1996 was a worrying time for myself and my colleagues because it was becoming more obvious that finances were an issue. We were operating out of old farm buildings at the time and having to make do with temporary repairs to equipment. At one stage when we couldn't afford any more diesel, we managed to syphon off a few gallons from an old excavator to enable us to cut greens and tees. When I think back, these were tough times."

"When American Golf came knocking at the door it was like Christmas. They were fairly impressed with what we produced, working with very little, so they were optimistic about what we could achieve given a reasonable level of resources and input."

"Although I probably didn't realise it at the time, it proved to be a turning point for myself and the club. I was given the opportunity to develop and improve the course and implement plans, procedures and a budget in an organised and structured manner."

"This was an exciting time and two years later we were given the funds to build another nine holes, bringing us up to 36, while also moving our maintenance operation into larger converted premises."

Dark clouds on the horizon

Peter continued: "Up until 2003, we had good stability in virtually every area of management within the club while members' playing rights were guaranteed. The level of resource in terms of equipment,