

# HOW HIGH?

## The Disturbance Theory take on mowing

By

Richard Windows & Henry Bechelet

Turfgrass Agronomists, STRI

### Nice dream

The essential purpose of greenkeeping is to produce the best possible playing surface under the prevailing conditions. For the vast majority of UK greens the ideal playing surface would benefit from a greater dominance of browntop bents and/or fine fescues (depending on the character of the course). The “Holy Grail” of greenkeeping is to achieve the desired fine grass dominance without having to compromise on playing quality. The seamless and artful transition from annual meadow grass to browntop bent and/or fine fescue dominance with the only change being improvement. No undue stress or deterioration, the greens simply keep getting better and better. Summer playing qualities improve, winter playability gets better, vulnerabilities decline and the benchmark is raised. The greenkeepers are praised and valued for their expert work. The golfers simply become ever more satisfied with themselves and with the world at large. Life is a wonderful thing and golf is one of its essential pleasures.

### Eyes down now

To favour the development of browntop bents and fine fescues in golf greens you simply have to set the correct environmental conditions. You need good drainage for wear tolerance and year-round playability. Sort it out. You need a sand dominated upper soil profile with an open structure to create the conditions required for hardy growth and for surface firmness. Sort it out. You then need to carry out regular overseeding to hasten the development of the desired species. Do it properly. You *then* prepare the surfaces without imparting too much physical damage to give the finer grasses a chance to flourish. This is the Disturbance Theory. You control growth properly so that you don't have to become too aggressive with the surface preparations or thatch management. Top dressing, brushing and rolling become the primary surface preparations rather than aggressive mowing and verticutting. If you

are new to this then check out “Changing the Nature of your Greens” at [www.stri.co.uk](http://www.stri.co.uk) for the proper induction. The use of stress will come to you later.

### **Fine and dandy**

This is the article about mowing. Mowing is the fundamental greenkeeping treatment and the one thing we must all do to prepare the final surface. It fines down the sward and evens out the surface to (ideally) give a free running and smooth rollout of the ball. Mowing has the most significant impact on playing quality of all greenkeeping treatments. The difference between the fast and the woolly could simply be the height of cut. We need to set our mowing height to suit the demands of the game.

### **Changes the nature of your greens**

The intensity of mowing also has a significant influence on the sward species composition. Disturbance is defined as the physical damage or removal of living plant tissue. Mowing *is* disturbance and can impart significant selection pressure on the sward. All plants have evolved to thrive under different levels of disturbance. The browntop bents and red fescues prefer a less disturbed environment and don't respond well to overly aggressive treatments. Annual meadow grass on the other hand thrives under disturbance. So, when trying to favour the finer grasses the DT way you should be trying to find ways of easing the disturbance pressure. Your mowing strategy is crucial for the development of the finer grasses and it cannot be ignored. Inconsiderate mowing is as bad as overfeeding.

### **The crown is king**

To set your mowing strategy considerately you need to understand how the grass plant functions. All the turfgrass species have evolved their anatomy and physiology over time and they are able tolerate close cropping. The grasses are actually unique within the plant kingdom because their growing point is hidden in the basal crown rather than at the end of the leaf tip. This is why turfgrass can be mowed regularly and still grow happily. Growth continues from the base of the leaf after the top of the leaf blade has been clipped off. Plant functioning is driven by energy conversion within the leaf fueled by sunlight and by the roots drawing water and nutrient from the soil. We must protect the functioning of the plant. Undue damage to any of the

key components to growth has a massive impact on the plants ability to perform its growth strategy.

### **Mowing pressures**

Disturbance pressure from mowing can vary considerably in its intensity. The intensity is governed by frequency of mowing, height of cut, sharpness of blades, the design of the mower and how it is handled. In recent decades the race for ever increasing green speeds has undoubtedly forced greenkeepers to focus on more intensive mowing practice. This is not helpful if we want to favour the finer grasses. Too much pressure in whatever form always becomes destructive.

### **Take, take, take**

The most obvious form of intensive mowing is cutting too low and for too long. Defoliation from constant overly close mowing damages the proper functioning of the plant as the leaf area available for photosynthesis is reduced. Dropping the height from 4 mm to 3 mm reduces leaf area by 25% and the plant functioning suffers as a result (this is more exaggerated in seedlings). The leaves produce the food source for the plant (carbohydrate), so if we remove too much leaf through cutting too low for too long the plant cannot assimilate sufficient energy to sustain healthy growth. Growth declines, rooting draws back and the plant weakens and becomes more vulnerable to environmental stress or other forms of damaging disturbance such as disease and wear. The turf thins and annual meadow-grass then takes advantage of these gaps through seed invasion. Annual meadow grass lies in wait for thinning opportunities and then establishes a vulnerable and weak playing surface.

### **Blind judgement**

Constant and excessive defoliation weakens the sward over a period of time but direct damage to the crown of the grass plant can cause much more rapid damage. One excessively low mowing operation (a scalp) is enough to damage the crown. When direct damage to the crown occurs, plants are severely damaged, cell division ceases and new leaf growth is unlikely. Such direct disturbance from extremely low mowing effectively destroys the grass plant. Annual meadow grass is usually the first coloniser into the scars created from such a treatment. The finer grasses become further away than ever.

### **Leave the crown alone**

As turf managers we need to appreciate the sensitivity of the crown and avoid damaging it at all costs. To favour the finer grasses, keep damage to a minimum by retaining sensible mowing heights and verticutting only when absolutely necessary. The reason why regular deep verticutting is so damaging is because it can affect the crown. Set the mower at the *optimum* level rather than trying to find the lower limit – it does no good. Additional protection can be afforded to the crown with regular top dressing. This will also firm the surface, support the weight of the mower and optimise the consistency of mowing heights.

### **Do it clean**

The quality of the cut is also important. Constant mowing using ill-set, blunt or wet blades bruises, tears and grazes the grass plant. This type of damage is draining to the system and is therefore a significant pressure especially if it is inflicted day after day. Such damage to the leaf increases the disease and drought susceptibility of the turf, which are added disturbance pressures. To eliminate this pressure, keep your blades sharp and avoid contact between the bedknife and the cylinder to ensure an optimum cutting (scything) action.

### **Battering**

Bruising damage is not restricted to blunt blades. More direct bludgeoning of the turf and most crucially the crown can come from slipping wheels on the triplex or the rear roller of a pedestrian mower. The most obvious form of gauging comes from the use of ribbed (Wiele) rollers. Therefore, be very careful to avoid this damage and consider replacing grooved rollers with smooth ones during periods of environmental stress. Remember that the effects of all types of damage are accentuated during very wet or dry (stressful) conditions.

### **Finishing touch**

There is probably very little to tell between the cutting quality of triple mowers compared to pedestrian mowers. However, the surface is considered to be markedly different with hand mowers generally providing improved ball roll at a slightly higher cutting height due to their rolling action. Hand mowing allows you to mow and roll in

one operation. Variance in the weight and ground pressure of different machines will result in different levels of polishing. Hand mowing also gives the greenkeeper a better connection with the growing environment via the senses of touch, smell and better sight. All good. If you are interchanging between hand and triple mowing then use a prism gauge to ensure that the actual cutting height is consistent between them.

### **Greenkeeping is about the greenkeeper**

The traditional guidelines to favour the finer grasses were always to mow at 5 mm in the summer and 8 mm in the winter. This rule was often (and sometimes still is) stuck to too rigidly. Such a rule constrains the greenkeeper and can compromise playing quality. We don't compromise on playing quality so some flexibility is required. Find your optimal mowing level that provides the desired playing quality and also allows the finer grasses a chance to come. This is the job of the greenkeeper not the text book. You can bring speed, smoothness and trueness with top dressing, brushing and rolling so you don't have to worry too much.

### **Your precise touch**

Put simply, your mowing strategy should concentrate on selecting the mowing height that offers optimal playing quality without causing the turf to weaken or thin. The height of cut should vary throughout the year in accordance with growth, surface and weather conditions. During strong growth, you may afford to cut a little lower but be sure to raise up and alleviate all forms of pressure during times of environmental stress such as cold weather, drought or cold winds. Use rolling, top dressing and brushing to keep the golfers happy whilst easing the pressure on the turf to allow the finer grasses to come.

### **Measuring stick**

We should all take the time to objectively monitor the performance of our turf. It will keep us honest and make us better turf managers. This means use the Stimpmeter to monitor pace regularly to see if you are measuring up to your ideal. You can keep this information within your team if you don't want to muddle the golfer. The golfer doesn't need to know the green speed to enjoy their game. They know what a good surface is without a number (unless of course they have a bad day).

## **Can you see?**

The real test of greenkeeping should not be “how low can you go?” but “**how high** can you mow and still produce the ideal playing surface?” Mowing too low will take you away from your true ideal by preventing the more desirable species from developing. The real measure of the greenkeeper is to be in charge of playing qualities *and* sward composition. Now that is skilful greenkeeping. The mower is the fundamental greenkeeping instrument and you need to know how to play it. Prepare your surfaces with all the available operations and don’t just over-rely on the obvious one. There is no need to be blind about this. “How high?” is the question.

Richard and Henry are advisory agronomists at the Sports Turf Research Institute, Bingley and they are here to help. They may be contacted by email at [info@stri.co.uk](mailto:info@stri.co.uk) for feedback (Subject: Turf Advice).