

# THE DISTURBANCE THEORY

These articles aim to give you a better appreciation of how to favour the finer grasses. Disturbance Theory comes from an ecological perspective and simply states that the nature of the environment, controls the composition of the sward. These three articles explain how the finer grasses can be successfully established and maintained within the modern golf green by simply managing the environment correctly. The role of the greenkeeper, is to understand and control the environmental pressures, to set the correct conditions for the finer grasses to flourish. If you understand The Disturbance Theory the finer grasses stand a chance. Our golfing heritage rests on fine turf.

## Do Not Disturb!

Richard Windows, STRI Turfgrass Agronomist.

Putting surfaces, dominated by the bents and fescues, provide consistent year round surfaces. Unfortunately, many of our greens continue to be dominated by annual meadow grass. A recent survey conducted by all STRI agronomists in the UK and Ireland for the R&A, proves this is the case. The results showed the average species composition in our golf greens in 2005, to be 56% annual meadow grass, 32% bent, 7% fescue and 5% perennial ryegrass/Yorkshire fog. Out of 598 courses assessed, 75% had greens supporting more than 50% annual meadow-grass. The annual meadow-grass dominance, makes our greens vulnerable and inferior during the winter. This information shows how many courses may be failing to reach their potential.

History has always blamed excessive fertiliser and water applications, to be the main cause of annual meadow-grass dominance in our greens. I used to as well, until I considered the ecology of the grasses involved the article "Changing the Nature of your Greens" explains this in more detail ([www.stri.co.uk](http://www.stri.co.uk)). In summary, annual meadow-grass enjoys disturbance, while the finer grasses flourish in a more settled environment. Annual meadow-grass, is so successful in golf greens because the environment is so disturbed or being constantly damaged. Disturbance pressure comes from surface preparations and of course play. In this article, we examine the effect of surface preparations on sward composition. The aim is to help you think about the preparation of your greens a little differently.

The true cause of annual meadow-grass ingress, comes from the creation of gaps in the turf. Constant physical damage (or disturbance) of the grass plant, creates these gaps. Modern greenkeeping practices and their mechanisation, have radically increased the disturbance pressure imposed on fine turf. We now mow incessantly and verticut and groom in an attempt to please the ever more demanding modern golfer. While such aggressive practices are done for the right reasons, they might, in the end, be causing untold harm. The symptoms can be seen, when the turf thins and the soil surface is exposed. Annual meadow-grass is adapted to exploit these conditions. It may therefore be true to say, the misuse of the triplex mower and modern turf refinement tools, are one of the main reasons for annual meadow-grass dominance in our golf greens.

Before we had these ultra efficient tools, the amount we refined our greens was restricted by time and the physical constraints of the human body. For instance, it took a long time to mow greens with a pedestrian mower and even longer when using a push mower or scythe! Not to mention the physically

demanding nature of the work. This meant it was largely impossible to over-manage and over-disturb putting greens. Consequently, the golf green environment was settled, which allowed the fine grasses to dominate. Fertiliser and water were kept to a minimum, as over-application simply made the grass grow faster! Greenkeepers knew the surface would be inferior, if grass growth was rapid. Growth was the last thing they wanted. A settled, undisturbed and unproductive environment, suited the finer grasses. It also produced the best year round putting surfaces. Old Tom Morris understood this.



Photograph 1: "Fast growth was the last thing greenkeepers of yesteryear wanted" Photo courtesy of St. Andrews Links Trust

"Fast growth was the last thing greenkeepers of yesteryear wanted when they were using scythes and birch besoms. This meant a settled and unproductive environment was created in which the finer grasses flourished." Photo courtesy of St. Andrews Links Trust.



Old Tom Morris taught us the real art of greenkeeping. Those that still follow these traditional principles produce the best and most consistent year-round putting surfaces. Photo courtesy of St. Andrews Links Trust.

The tranquillity of this settled and unproductive environment, was forever interrupted with the introduction of the triplex mower around 1968. Suddenly, greens could be mown in a fraction of time, meaning they were done so more regularly. They were even mown when it was not necessary! Further technological advances allowed the machines to follow contours, which facilitated ever closer mowing. In essence, triplex mowing increased disturbance pressure on the turf.

Soon after the triplex mower, came the introduction of more efficient and effective turf refinement tools. These mechanical tools, with their motor driven rotating steel blades (now with tungsten tips), were much more aggressive than the bristles of a brush - you can almost see the fine fescue and bent turf quivering at the prospect! Their ease and

efficiency of use allowed the frequency of operation to increase. The result was increased disturbance pressure on the turf.

The use of the triplex mower and more efficient turf refinement tools, gave golfers the faster surfaces they demanded. However, little regard was given to their damaging effect on our fine turf. To put it simply, the fine fescue and bent could not cope with the damage. Consequently, the sward began to thin and gaps were created. Annual meadow-grass exploited these gaps - the invasion had begun. To help the thin and damaged turf recover, more fertiliser and water was applied. The annual meadow-grass thrived in this more disturbed and productive environment. Our fine turf putting surfaces began their decline and many would never be the same again. The era of aggressive surface preparation and high input greenkeeping had (to our shame) arrived.

Many greenkeepers ignored the trend of more aggressive surface refinements. They knew it wouldn't make their surfaces any better. To this day, courses that have upheld austere greenkeeping principles, continue to provide the best putting surfaces. The greenkeepers charged with the management of these courses, still follow what Old Tom did all those years ago. They know the slow growing fine fescue and bent grasses, only require gentle refinement to produce high quality putting surfaces. While modern machinery is used, it is used with great caution. For instance, verticutting is implemented occasionally and only when the fine grasses are growing strongly. The greens are never scalped. Fertiliser and water, are always kept to a minimum - as over application will only require more aggressive refinement. Consequently, these environments remain

settled and unproductive, which is why the fine grasses continue to flourish. Old Tom Morris taught us this approach. We now call it "traditional greenkeeping".

The results of traditional greenkeeping were once again highlighted to the international golfing fraternity, during the 2005 Open Championship played over the Old Course, St. Andrews. During the Championship, the greens were maintained at 4.5 mm. Mowing was omitted when it was not necessary - the slow growing fescue and bent, simply did not need to be mown every day. Light brushing, light top dressing, a little rolling and May verticutting was sufficient to provide over 10.5 foot on the Stimpmeter and smooth true ball roll for the world's best players. Contrast this to the normal maintenance for Major championships, when the greens are scalped two or three times a day! It is obvious which grass this will promote.

I have perhaps blamed the triplex mower and modern turf refinement tools rather unfairly, as they are, of course, great innovations and have improved the quality and efficiency of surface production. Of course the problem does not lie with the machines but the way in which we use them. All too often they are used too frequently and too aggressively. Such misuse increases disturbance pressure on the turf. When the pressure becomes too great, the turf thins and gaps are created and annual meadow-grass invades. To help the turf recover from the pressure, requires a heavier hand with the fertiliser bag and irrigation sprinklers. It is this combination of disturbance and greater productivity, that leads to annual meadow-grass dominated greens.

I have no doubt that the production of better putting surfaces can be achieved by the promotion of the finer grasses. To be successful in this aim, we must adapt our management practices to minimise disturbance and reduce productivity. In essence, the way in which we prepare our surfaces must become less aggressive. This is not too difficult to achieve so let me describe some simple strategies...

- Reduce mowing frequencies. Ask yourself - do you really need to mow all the time? Can occasional operations be missed?
- Raise the height of cut. Every greenkeeper knows what height is comfortable and stress free for their turf. You should go no lower than this height. Do not push the limit of your turf it simply will not cope.
- Miss out the final perimeter cut a couple of times a week. The perimeters of the greens are where we see the first symptoms of excessive disturbance. Never engage groomers or verticutters on this perimeter pass.



The results of traditional greenkeeping were once again highlighted during the 2005 Open Championship at St Andrews



Careful use of rollers can help provide the playing conditions golfers require without imparting excessive disturbance pressure on the turf

- Relax verticutting and scarification. Consider brushing or light grooming, to gently refine the turf. When verticutting or scarification is necessary, ensure the finer grasses are growing strongly to aid rapid recovery and follow with bent/fescue overseeding, to encourage the restoration of full grass cover. Under no circumstances scarify when annual meadow-grass is seeding.
- Increase top dressing frequencies to smooth and firm the surface, as well as diluting the thatch. Avoid harsh operations to work the material off the surface. This hurts your turf.

- Use rollers or a Turf Iron to provide a little extra pace and smoothness when required. This will ensure the greens can be maintained at a higher cutting height.
- Increase hand mowing instead of triple mowing, as it causes less disturbance and allows you to closely monitor the environment.

The true reason for annual meadow-grass ingress into our fine turf putting surfaces, was the creation of gaps in the turf. Aggressive surface preparations were one way such gaps were created. Excessive inputs of water and fertiliser were applied to restore the cover after damage. This created a productive and highly disturbed environment, in which annual meadow-grass thrived and dominated. The current era of aggressive high input greenkeeping, continues to promote this undesirable species. To restore the dominance of the finer grasses, we need to provide a more settled and less productive environment. To do this, we will have to prepare our surfaces differently but not to the detriment of the playing quality. The key to this strategy is the minimisation of disturbance. This means being less aggressive with your surface preparations, by more cautious use of the triplex mower and modern turf refinement machines. With this approach, you will soon see the finer grasses returning to your greens.

# Irrigation - The Tool of Agronomic Change

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The misuse of irrigation delivery, is one of the reasons for the decline of the finer grasses on UK golf courses, over the last 40 years. This, alongside the arrival of the triple mower and compound fertiliser in all its forms, spelt disaster for the bents and fescues. The production of softer and lusher turf, made the game easier and also happened to suit the TV companies who could send appealing ultra green images into our living rooms. The "green is god" age had dawned and we quickly descended into agronomic oblivion to drown in a sea of *Poa annua*!

So, how do we set about righting the wrongs and creating the correct environment for our preferred grasses? Well, the very tool that partly initiated the decline, could be the salvation. Irrigation is the most powerful agronomic tool, providing it is used correctly.

In the article "Changing the Nature of Your Greens" ([www.stri.co.uk](http://www.stri.co.uk)), the argument is made that unnecessary disturbance, is the main reason for the loss of finer grasses on our golf greens. We have inadvertently created an environment more suited to opportunistic grasses such as annual meadow grass (*Poa annua*) by feeding and watering and then having to use aggressive disturbance techniques to create the playing surface. The finer grasses simply cannot cope with intensive disturbance, whereas *Poa annua* likes nothing better.



The installation and subsequent misuse of automatic irrigation systems, was one of the maincauses in the decline of our fine grasses