

PRIDE AND JOY

By

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Last up

It's interesting to reflect back. The first Disturbance Theory article was "Changing the Nature of your Greens" and it started with a bold ambition...

"Our objective is to help you understand that the nature of the environment controls the composition of the sward. With this understanding you can take better control and bring improved quality. If you can see how nature works you may become a better part of it. You need to be able to adapt. We want you to start formulating your greenkeeping strategy in terms of managing environmental pressures. We mean to get you thinking about your greens differently."

We were younger then. We don't know how successful we have been but we gave it a go. This is the final Disturbance Theory article and it is the one where we try to draw everything together.

Picture this

Your greenkeeping plan is formed in your mind. You picture the ideal surface then form a plan to set about achieving it. The imagined ideal surface will draw from your understanding of the style of the course, the required playing qualities (the take, release and hold of the ball), the prevailing climatic conditions and the resources available. You will see what is needed and what is possible then aim for a realistic target.

Sward species composition should be a key consideration for your ideal putting surface choice because it has a radical impact on surface playing qualities, its susceptibilities and the maintenance requirements. You shouldn't overlook the different grass types when deciding about the future development of your greens.

In the zone

If your decision is to strive for an ideal putting surface that contains an increased proportion (or complete dominance) of the Browntop bents (*Agrostis capillaris*) and/or fine fescues (*Festuca rubra spp.*) then the Disturbance Theory is here to help. With our articles and lectures we have tried to arm you with a simple understanding of plant growth strategies to help you to manage the environment in favour of the desired species blend. This way of thinking will allow you to make progress without having to compromise on playing quality. Check out www.stri.co.uk for the complete set of articles. What becomes clear by following this path is the need for flexibility. If you are going to successfully change the sward composition you will need to be able to work within the dynamic environment and try to keep it within the desired zone. This article will tell you about the journey towards the fine grasses and what you will need to do along the way.

So we say

To favour the development of the browntop bents and fine fescues in UK golf greens you will need to master four distinct stages of greenkeeping. Each step has different objectives and they each require a particular method to succeed. Put simply, each stage must be completed before moving on to the next. We think that the failure of greenkeepers to make significant progress with the finer grasses is because the approach isn't phased in the right way. This article is about setting and maintaining your focus.

The four phases

We think that the four different phases of greenkeeping are...

- **Phase 1: Lay the foundations**
- **Phase 2: Manage the establishment**
- **Phase 3: Pressure the *Poa***
- **Phase 4: Prevent re-invasion**

Each phase has specific objectives and they require different tactics to complete. Take your time to complete each stage before trying to move on. You will need to be patient. Objective measures can tell of progress towards target areas.

Phase 1: Lay the foundation

The first leg of your journey is the starting point for most. Putting surfaces with annual meadow grass (*Poa annua*) dominance, an organic matter rich turf base and less than ideal drainage. Playing qualities can be variable throughout the year and the surfaces are vulnerable to extremes of weather and disease attack. You want to change the nature of your greens. Your primary objectives at this stage are to improve drainage and reduce the organic matter content of the soil profile. This will immediately improve playing qualities especially through the winter. It will also create an environment where the finer grasses can start to flourish.

Try to get through this stage as quickly as possible so spend your energy informing your club and the players of your intentions. Explain the procedure and sell the benefits of success. Tell them that if carried out correctly this stage won't last forever. Better greens for longer in the year is a fairly compelling objective for most golfers and golf clubs.

If your underlying drainage is really poor you need to be thinking pipe drainage or even green reconstruction.

Work against the organic matter by hollow tining (with big enough tines) or deep scarification, integrate top dressing and aerate like mad. Don't worry about disturbance at this stage because there is nothing to save. Ensure you change the reason for the thatch accumulation in the first place by amending the previous fertiliser or irrigation programme.

If shade is a problem then thin or remove the trees (under guidance of an ecologist or tree expert).

Turn the situation around as quickly as possible to keep the golfers happy. Sample organic matter content through the soil profile to monitor progress and to review the success of the methods being employed. Work towards specific targets.

You complete this stage when you have created a surface with an open aspect that is founded upon a sandy and free draining soil. The greens are already better and now you can start thinking seriously about changing the grass types.

Phase 2: Manage the environment

With the foundation placed you can start with the **art** of greenkeeping. Changing the sward species composition to establish the Browntop bents and fescues requires subtle management of the environment. Here we begin overseeding in earnest and setting the environment required to shepherd the seedlings into established plants. We also want to allow the established plants to flourish. This is achieved by preparing the surfaces in a different way.

Our knowledge of the plant growth strategies tells us that constant damage (disturbance) will favour the annual meadow grass while the finer grasses prefer more settled conditions. We reduce the need for aggressive treatments with the judicious use of fertiliser and irrigation inputs to keep growth and thatch production under control (PGRs?). We begin preparing the surfaces through top dressing, brushing, rolling and less aggressive mowing and verticutting to keep disturbance pressure to a minimum. We continue to aerate to maintain the optimal soil conditions but without it being detrimental. We still provide firm, fast, smooth and true surfaces for the golfers to enjoy but we start doing it in a different and less damaging way.

Successful overseeding requires you to be picky. Use quality seed and apply it at the correct rate when there is a chance of success. Be sure to place the seed to the correct depth (with soil contact) and give it enough space to come through. Hold back the competition from the existing sward before overseeding with the use of plant growth regulators. Manage the establishment considerately to give the new seedlings a chance to take hold. A healthy and settled environment with minimal stress is the order of the day. Stress is no good for new seedlings so ease the pressure from the environment.

This tends to be the longest phase but it isn't endless. Take heart that you have already improved the situation beyond recognition through Phase 1. As the finer grasses establish and assume dominance your mind will start thinking about hastening the process by stressing the annual meadow grass out. You should only move to the next stage when you are sure that you can lose the annual meadow grass without losing playing quality beyond the patience of the players. Think hard before moving on.

Phase 3: Pressure the *Poa*

This is the phase where we start playing with the pressures. Through Phase 2 you will have become attuned to the idea of managing environmental pressures and through this stage you will start to employ that understanding in a more forceful way. The objective here is to force the annual meadow grass out.

Through this phase we are still looking to favour the fine grasses so our surface preparations remain focused on minimising disturbance. We continue to prepare our surfaces primarily with top dressing, brushing and rolling (with occasional verticutting only as necessary) but also look for the chance to use stress against the annual meadow grass.

At this time we use our understanding of plant growth strategies to play on the strengths and weaknesses of the different species. The browntop bents and fine fescues have developed a far greater ability to withstand an element of stress than the annual meadow grass. None are true stress-tolerators, so don't apply too much stress for too long or the favoured species might also suffer. Use stress in a short-term and controlled fashion to weaken the annual meadow grass without damaging the bents and fescues and then take advantage of the situation by overseeding.

We do have different forms of stress to play with. Constraining water and nutrient availability (and promoting soil acidity) can all be used to exert a positive selection pressure onto the sward. Be very careful though because extreme stress can directly damage the desired species and it can also encourage disturbing disease and pest

attacks. The safest method in the UK is to restrict water availability for a short time at the end of the summer. The finer grasses are naturally strong in this area and will be able to cope. This can be used on the run up to overseeding and then quickly eased afterwards to aid establishment.

Restricting fertiliser inputs can also help weaken the annual meadow grass but should not be used at the expense of recovery. After stress we need to take advantage of the situation quickly. We can use gentle acidification stress with the use of ammonium sulphate based fertilisers. Just take the annual meadow grass out of its comfort zone while keeping the finer grasses within theirs. Manage environmental pressure to select the desired species.

Interestingly at this stage we do not want to use products that improve the stress tolerance of the annual meadow grass. A constant reliance on phosphate fertilisers should be avoided for this reason. We must also ensure that the soil doesn't become water repellent by being dried out too much.

In this phase we hasten the development of the finer grasses by taking opportunities to push the annual meadow grass out and then overseeding to take the open ground. You know you have reached the end of this stage when you are more concerned about preventing annual meadow grass invasion than forcing it out.

Phase 4: Prevent invasion

When we achieve a dominance of the finer grasses (or indeed have started with a newly established one) the objective is to prevent deterioration in the form of annual meadow grass invasion.

Annual meadow grass's reproductive strategy is second to none and it produces seemingly magical seeds that can find and take advantage of any sward openings and at any time of the year. Knowing this we must work to minimise the formation of gaps within the sward and also make the turf base unattractive for the germination and establishment of annual meadow grass seedlings.

In this phase we maintain the development of a dense and healthy sward with the appropriate use of fertiliser and irrigation inputs and with the use of plant growth regulators. We must try to prevent direct damage to the sward by managing wear properly and by being vigilant with our pest, disease and dry patch control strategies. We should not contribute to any form of thinning by keeping unduly aggressive treatments to a minimum. We continue to overseed to fill any gaps that do appear.

The regular top dressing using an appropriate sandy material will have served to create a dry and sandy turf base that is not favourable to the successful germination and establishment of annual meadow grass seedlings. The use of sulphate of ammonia-based feeds will have acidified the seedbed to help in the same way.

Of course we must continue to manage the soil profile. Continue to spike or prick as necessary to keep the surface receptive to water infiltration, to aerate the soil profile and to allow the integration of top dressing as needed. Take care by using the most effective and least harmful method.

Annual meadow grass will invade at times so we need to revert back to the methods learnt in Phase 3 to push it back out again. Use appropriate stress without it becoming too damaging.

You are now managing the natural ebb and flow of sward species composition. You are successfully handling the tricky environmental balance that favours the development of the bents and fescues over the annual meadow grass. You have reached the high ground and you have got here by taking nothing for granted. You have stayed focused on achieving your goal. When does it end?

Fra-dumph tshhhhh

So, this is where the The Disturbance Theory ended up. How did we do? Are you thinking about your greenkeeping in a different way or left cold by it all? Doesn't matter now. Just know that sward species development is about creating a favourable environmental balance and understand that you can influence proceedings. The different species will respond to *your* environment, so manage the one that you need. Above all, do it in a way that continues to make the surfaces better and better no

matter what. In the end we just hope that the greens become your pride and the golfers joy.

Forgive us for the mistakes and the gaps but we think that enough is enough.

Thanks to Megan Hood (NZSTI) for joining in and helping.

Richard and Henry are advisory agronomists at the Sports Turf Research Institute, Bingley. They may be contacted by email at disturbance.theory@stri.co.uk for feedback (Subject: I think your mistakes are....).

Megan is contactable via nzsti.org.nz (Subject: Maybe you could shed some light on this for me...)

The End.