



Your greenkeepers will have attended workshops and seminars

yourself. The most important part of communication is listening. Listening to the experts!

Trying to achieve the impossible - AKA the Augusta syndrome. By all means be the best that you can be, but it's important to be realistic. Budget, weather, landmass, soil type, membership are just some of the factors you need to work with. No two courses are the same, so to expect to emulate Augusta at a traditional members club and after a hard British winter is like expecting your family BMW to win the F1 championship.

Work with what you have got here, work with Mother Nature. Artificially changing your course to emulate another is never as good as the more natural approach. Just look at the top 100 courses and you will see that they work with what's natural. If you work against Mother Nature she will win, like all women they are far superior to us mere men. She also has a bigger budget.

Don't neglect your prized possession...your

greenkeeping team! Remember now that you are on the committee, you are an employer. Yes, as an employer, you have the same duty and lawful responsibility as every other employer:

- Health & safety
- Welfare & working conditions
- Bullying & harassment
- Stress awareness
- Training and development

These are just a few of the things you need to be aware of. Every employer needs to protect their staff from bullying and harassment to dangerous practices - golf courses are no different. You have a duty of care.

Ensure your staff has the appropriate PPE and working conditions:

- Is the maintenance department up to modern legal standards?
- Do the machines comply with modern EU regulations?

• Do your members bully and harass your staff?

• Do your staff members have a development plan?

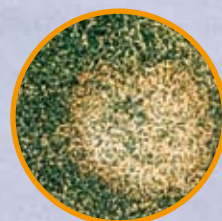
It is imperative that both the greenkeeping team and the committee have respect for each other's role. Why not join your greenkeeper; learn from him, respect him, walk the course with him and ask questions...become a valued member of the team. Listen to the advice that you pay for, trust your consultant and greenkeeper. Take a day out with your greenkeeper and go to Harrogate for the BTME show, attend the seminars and conferences, dream about winning the lottery and what shiny new machines you could buy. Then buy your greenkeeper a pint afterwards.

Develop a good working relationship with your greenkeeper and become part of the team - Together Everyone Achieves More - TEAM. Corny, I know, but so true.

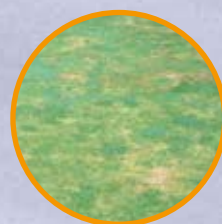
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# REDUCING YOUR CARBON FOOTPRINT

*A closer look at what a carbon footprint consists of and advice as to how you can go about reducing yours...*



# Reducing Your Carbon Footprint

Climate change is becoming more and more of an issue in our day-to-day lives and was certainly a hot topic at our annual Harrogate Week show earlier this year. Take the freak snow storms the UK suffered during the month of February, would these have happened or have been as intense if we had thought about reducing our carbon footprints earlier? Many golf courses had to close for at least a week during this month, hitting hard the already diminishing pockets of clubs. With the 'recession' in full swing and adverse weather conditions becoming a more regular occurrence, surely it's time to take heed and start making some changes.

This supplement aims to open our eyes to the environment and offer advice and tips on how we can work together to help prevent climate change. Melissa Jones reports...

## What Is A Carbon Footprint?

A carbon footprint is a measure of the impact our activities have on the environment, and in particular climate change. It relates to the amount of greenhouse gases produced in our day-to-day lives through burning fossil fuels for electricity, heating and transportation etc.

The carbon footprint is a measurement of all greenhouse gases we individually produce and has units of tonnes (or kg) of carbon dioxide equivalent.

A carbon footprint is made up of the sum of two parts, the primary footprint (shown by the green slices of the pie chart below) and the secondary footprint (shown as the yellow slices).

1. The primary footprint is a measure of our direct emissions of CO<sup>2</sup> from the burning of fossil fuels including domestic energy consumption and transportation (e.g. car and plane). We have direct control of these.

2. The secondary footprint is a measure of the indirect CO<sup>2</sup> emissions from the whole lifecycle of products we use - those associated with their manufacture and eventual breakdown. To put it very simply - the more we buy the more emissions will be caused on our behalf.

Info taken from:  
www.carbonfootprint.com

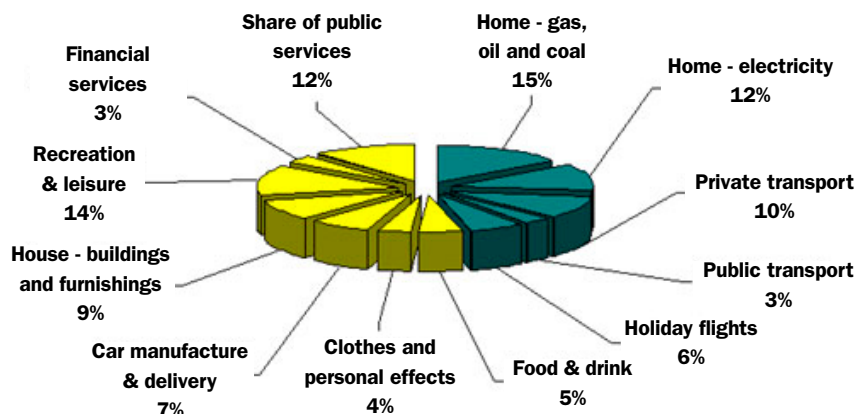


## Curious As To The Size Of Your Carbon Footprint?

The following are a few of many websites that can calculate your carbon footprint:

- [www.carbonfootprint.com/calculator.aspx](http://www.carbonfootprint.com/calculator.aspx)
- [www.footprint.wwf.org.uk](http://www.footprint.wwf.org.uk)
- [www.whatsmycarbonfootprint.com/calculate.htm](http://www.whatsmycarbonfootprint.com/calculate.htm)
- [www.co2savings.co.uk](http://www.co2savings.co.uk)

**FACT:** Did you know...Electricity is one of the biggest producers of carbon emissions, so every time you make a coffee or turn the television on you are adding to global warming.



# WILDFLOWER MIXTURES

A beautiful vista can be created by using the new low and slow growing grasses combined with a dedicated range of wildflower mixtures now available from Rigby Taylor.

Areas sown with seed from this individually created Mascot Environmental Flora Range play a crucial role in helping to foster biodiversity within the environment. With serious concerns about declining wildlife populations from sparrows to bumble bees these sites will help to provide a natural haven for our animals and insects. Parks, open spaces, highway verges, corners and non-used areas of sportsgrounds, together with areas of rough on golf courses can all benefit from this approach.

With native wildflower species including cornflowers, ox-eye daisies, poppies and ragged-robin (all a far less common sight than they used to be) a sowing of these quality seeds can help to redress nature's balance and ideally are sown in the spring or autumn period.

Wild flora mixtures are designed to suit a wide range of soil types from chalk and limestone, sandy, heavy clay, woodland, through to coastal. In addition bespoke site-specific native mixtures



can also be created. Traditionally sold as an 80% grass seed and 20% wild flora combination the average sowing rate is 5 gms/m<sup>2</sup>.

To reduce maintenance costs once these wild flora areas are established only occasional mowing

is required, so also benefiting the environment.

What better than a combination of sustainable grasses and a mass of stunning natural wild flora to create an impact for the public and members of clubs to enjoy?

## Providing recovery for your high wear problems



### R116 Fine Rye Greens Renovation

**Mascot R116** is a high quality mixture containing Perennial Ryegrasses, Slender Creeping Red Fescues, a Chewings Fescue and a Browntop Bent species for use in situations where problems with high wear and shade exist.

The Perennial Ryegrasses *Greenway* and *Ace* give fineness of leaf, and density with the ability to continue growing at low temperatures. Both blend well with Fescues and Browntop Bents and their low crowns mean they can be maintained at much lower cutting heights.

The Slender Creeping Red Fescue *Lanai* and the Perennial Ryegrass *Greenway* provide dense growth early and late in the season, reducing stress and increasing sward density during the autumn, winter and spring periods.

**Mascot R116** is a unique mixture that accepts greater wear and tear than traditional products and maintains year round colour through the combination of species used.



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# Talking Heads

	How has climate change affected your course in recent times?	How have you overcome these problems?
 <p><b>Name:</b> Gordon Moir <b>Position:</b> Links Superintendent <b>Club:</b> St Andrews Links, Central Scotland</p>	<p>I'm not sure if you can relate things to climate change or just the natural process and weather patterns but we have been combating coastal erosion over the past 12 to 15 years, but looking back over periods of history it is nothing new. We also commissioned a survey on rising sea levels early in 2008. Other than that, I would say that the seasons are appearing to merge but then, this winter has been the coldest for some 15 years, especially the period from October to Christmas.</p>	<p>We had done some protection work on the coast in 2001 - which we repeated last September/October.</p>
 <p><b>Name:</b> Rob Holland <b>Position:</b> Course Manager <b>Club:</b> Birchwood Park Golf Centre, Kent</p>	<p>Climate change has had an effect on our course over recent years. More extreme weather patterns are emerging which we have had to respond to. Most importantly for us as a predominantly society orientated venue is maintaining high standards of presentation and playability, during the severest of conditions.</p>	<p>We have increased our aeration programme to ensure maximum filtration of excessive rainfall and promote deeper rooting during drought periods. Maintaining a focus on what you're trying to achieve is vital to see through the harshest of conditions.</p>
 <p><b>Name:</b> Paul Worster <b>Position:</b> Course Manager <b>Club:</b> Minchinhampton Golf Club, Gloucestershire</p>	<p>Weather patterns have become far more erratic and difficult to predict. A sequence of dry summers gave way to two extremely wet and cool summers; winters have been largely non-events until this year. The courses have been overplayed under poor conditions which has affected presentation at times.</p>	<p>It has been necessary to step up certain operations such as light sanding, traffic control, and aeration when conditions allow. A word of warning - sometimes it is better to skip an aeration process rather than forging ahead at all costs under poor conditions.</p>
 <p><b>Name:</b> Colin Webber <b>Position:</b> Course Manager <b>Club:</b> Portmore Golf Park, North Devon</p>	<p>In 1987, the hurricane that wasn't, totally demolished our family farm buildings - that was the first time that I had heard of global warming or climate change. This eventually along with the last recession and a new trunk road saw the demise of our farming activities and in 1993 we opened the doors for business as Portmore Golf Park. The last two wet summers have affected income significantly with a reduction in golf course income falling by 16 percent, both from membership and more significantly pay and play. Both club and county matches have being cancelled and on too many occasions the normal club competitions have been reduced to 9 holes, frequent trolley bans have been in place. I have had many upset customers.</p>	<p>Since mid December we have had significantly less rainfall, trying to get the surface water away has proved difficult we tried a ground breaker - it is early days yet but it has improved some areas and made some worse. Walkways and surrounds have been improved by top dressing with compatible pure sand, the introduction of hedgehog trolley wheels has made a massive difference, no more trolley bans.</p>
 <p><b>Name:</b> Ceri Richards <b>Position:</b> Technical Sales Manager <b>Company:</b> Avoncrop Amenity Products Ltd</p>	<p>Yes. I have noticed milder winters mean that greenkeepers are cutting right up until Christmas, whereas, even 20 or so years ago - I remember long frosts that started in October. This has also led to an increase in leatherjackets that are no longer killed off in hard frosts.</p>	<p>The best way is to view it as a challenge! Longer cutting seasons have been made easier by advances in mower technology and pests and diseases can still be treated, for the moment.</p>
 <p><b>Name:</b> Thomas Murray <b>Position:</b> Head Greenkeeper <b>Club:</b> Ratho Park Golf Club, Edinburgh</p>	<p>Wetter/milder months during the winter have brought problems, certainly to older constructed golf courses with poor drainage, causing more course closures and the risk of more fungal diseases.</p>	<p>We are working on improving our drainage throughout the course. Pruning and thinning trees to allow more light and air flow throughout our parkland course.</p>

# Reducing Your Carbon Footprint

What measures have you and your club put in place to reduce your carbon footprint?	Does your golf club recycle? If so, what?	What advice can you offer golf clubs that are struggling to cope with erratic weather conditions?
<p>No specific measures, although we try and act sensibly in our transport plans, orders, deliveries etc.</p>	<p>We recycle all our grass clippings and other materials from the course such as any gorse or bushes we cut back which we chip and compost. Also any sand/soil from repairing bunkers/any construction work is recycled and used again in either divot mix, topdressing material or in new construction work. Nothing like that leaves the site. Above that we recycle all paper from our offices etc and most of the glass, plastics and cardboard from our clubhouses and golf shops or that which is collected on the golf courses in the rubbish bins. Other items recycled include printers, cartridges, computer monitors, metal.</p>	<p>Have an audit carried out to see if your drainage system and irrigation system are as efficient as they can be.</p>
<p>As one of the Burhill Golf Centres, we have instigated a thorough environmental policy which encompasses all 10 of our courses. We are committed to preserving our local environments for our communities and enhancing habitats for all indigenous flora and fauna. We regularly monitor all waste management to ensure our individual sites maintain a high degree of professionalism towards a continual reduction in our carbon footprint.</p>	<p>At the moment we recycle cardboard and glass at the clubhouse. Our aim over the next couple of years is to install recycling bins at some of the tees for golfers to put relevant empty packaging into so they can see our commitment to maintaining the environment they play in.</p>	<p>Never be surprised with the British weather! Extremes of heat, cold and precipitation rates at both ends of the scale at a time of year when it really shouldn't be happening are going to become the norm. Have a plan, stick to it and always be prepared.</p>
<p>The Club has recently had an "Energy Audit" carried out. It revealed that 90% of our energy usage was in the clubhouse and an action plan was designed to reduce energy use. As a result, we have been able to target certain areas such as changing the existing lighting throughout the Clubhouse to low energy bulbs, which should reduce energy use by an estimated 20% annually. Money saved each year through such schemes is to be placed in a budget, which will finance the next stage of energy efficiency improvements in the following years.</p>	<p>This club recycles paper, cardboard, plastic bottles, glass bottles, aerosols, used engine oil and filters, cleaning fluids, and we compost everything from the golf course - including greens grass clippings.</p>	<p>The biggest piece of advice would be not to panic and over-react. Golf courses are outside and are subject to influences largely beyond our control. Good dialogues including facts and figures are essential to keep the lines of communication open with your membership. I try and concentrate on good standards of presentation under adverse conditions, rather than trying to fight the conditions themselves.</p>
<p>The greens are USGA and we have changed to pure fescue which has meant that chemical fertiliser usage is virtually nil and only a small amount of organic N is being used. We have not used a fungicide in 14 years. I recently commissioned a carbon footprint analysis and we currently produce 84.98 tonnes of CO2! 53.99 % of which is on electricity and 29.05% diesel! A lighting audit on the clubhouse alone showed that simply by changing light bulbs gave an annual saving of £1400! Recycling our waste has reduced our wheellie bin cost by half.</p>	<p>We recycle all cardboard, glass, tin and plastic with hopefully the food waste being composted in the near future. I recently had a visit from a wind turbine expert, there are currently grants available of 20 % of the total cost of any renewable energy projects. In the very near future any excess energy that you produce from a renewable source, will be paid at around 30p per unit, the payback period could be as little as five years on a turbine that has a life of 25 years, so free electric.</p>	<p>As greenkeepers you will have massive powers of observation, use them to look at your own business, you will find that your customers like what you are doing as well (as long as you tell them) not just from an environmental or cost saving angle, but aiming toward a totally self-sustaining future can only be good for all of us, we have all got to do something to reverse the effects of the last 80 years, get outside your box and give it a go, life is what you make it.</p>
<p>Because of the recent mild, wet summers I have seen golf clubs diesel bills rising due to the extra cutting required. So some clubs are considering the economics of using PGR's - I also think that the recent economic downturn will force golf clubs to bring in energy saving measures due to financial pressures, rather than a desire to cut CO<sup>2</sup> emissions.</p>	<p>I see that most golf clubs I visit now have separate skips for cardboard and plastic (but again, this was mostly brought in due to local authority rules rather than a decision by the club to become greener). Most chemical companies now package their fungicides, for instance, in much smaller packaging than in the past, as small as 500g per hectare for instance. Most greenkeepers I know recycle plastic containers.</p>	<p>As I said earlier, view it as a challenge. Look out for leatherjackets and also diseases like Anthracnose and Dollar Spot that have become more prevalent due to the changing climate. Show your club that you are 'doing your bit' to save energy by presenting a report on the subject ASAP.</p>
<p>The control of grow regulators on turf have seen a reduction of grass cutting throughout the golf course. More use of re-cycled products that are available today.</p>	<p>On the golf course side we recycle cores from greens and surrounds, tree prunings, leaves from trees, tree posts and glass bottles. Our future plans are to recycle water, grass cuttings, cardboard, paper.</p>	<p>My advice would be on putting together, with the backing of your club committee, and possibly seeking professional advice on a long term policy plan for improving golf course drainage and environment on the golf course.</p>

# FACING UP TO GREENHOUSE GASES

By Maureen Keepin

Recognised as a worldwide problem a dramatic rise in greenhouse gases - in particular carbon dioxide – called for drastic action.

As a result, in December 2007 the 'Kyoto protocol' was signed by 174 countries with the objective of reducing greenhouse gas emissions. The aim was to encourage those undertaking polluting activities to become more efficient in their production processes through international exchange allowances for carbon dioxide (CO<sup>2</sup>).

Put into place jointly with the Clean Development Mechanism (CDM), these negotiable allowances permit industrialised countries to benefit from carbon credits following investment in these cleaner technologies.

A carbon credit unit is generally taken as one tonne of greenhouse gas being equivalent to one tonne of CO<sup>2</sup>.

Brian Robinson, Director of Seed Research at Rigby Taylor said: "This issue is not just about large industrial concerns as we all have a vital role to play in reducing greenhouse gases."

## HOW THE CARBON CYCLE WORKS

Research demonstrates that man's activity contributes to an annual increase of 6.5 Petagrammes (Pg) of CO<sup>2</sup> per year, which equates to more than 6,000,000,000 tonnes.

Nature is a wonderful thing and around half the carbon produced is reabsorbed by the biosphere through increased photosynthesis and in the oceans by dissolution.

Problems arise because more than 3 Pg of CO<sup>2</sup> per year are not sequestered – contributing to a substantial increase in greenhouse gases.

The carbon cycle is the biogeochemical cycle by which carbon is exchanged between the biosphere, rocks, oceans and the atmosphere. The cycle is made up of carbon sinks, where carbon is stocked, and fluctuates between them.

There are three types of cycle for carbon stocking:

- Short term e.g. the atmosphere, which renews its carbon every five years.
- Middle term e.g. humus in the soil or in a forest which can stock carbon for a few hundred years.
- Long term e.g. erosion of limestone rocks over more than 300 million years.

In a growing forest every one tonne of dry wood has the potential to stock 1.8 tonnes of CO<sup>2</sup> for several hundred years. However where trees decompose or the forest burns this carbon enters into the soil or the atmosphere as CO<sup>2</sup>.

The earth's topsoil is a most valuable carbon sink as it stocks more carbon than all the earth's vegetation and atmosphere combined. The quantity of carbon stocked in the earth's soils is estimated at 1.600 Petagrammes.

This topsoil or humus is formed by the action of the decomposition of micro-fauna, fungi and bacteria into organic plant residues, which can stay in the soil for hundreds or even thousands of years.

And worldwide the most fertile soils are the chernozems found beneath natural grassland extending across Russia, the Ukraine and Canada.

Where the rapid mineralization of humus takes place losses can be in the order of 10 tonnes/per annum/per hectare in temperate climates and reach a few hundred tonnes in tropical areas.

Consequently even small changes of sequestration per square metre can produce significant changes to the global equilibrium of carbon.

## WHAT IS THE GREENHOUSE EFFECT?

The greenhouse effect we hear so much about is a natural process that warms the atmosphere. It is caused by greenhouse gases in the atmosphere and is made up of:

- water vapour (55%)
- carbon dioxide CO<sup>2</sup> (39%)
- methane CH<sub>4</sub> (2%)
- ozone (2%)
- nitrous oxides (2%)
- chlorofluorocarbons (CFC-11 and CFC-12)

Greenhouse gases absorb part of the sun's rays reflected from the surface of the earth (infra red) that cannot escape into space.

Importantly methane as CH<sub>4</sub> is 21 times more effective as a greenhouse gas than CO<sup>2</sup>.

So how does methane form? When an animal or a plant decomposes by fermentation or putrefaction in the absence of oxygen methane is produced.

Much of the methane present in the atmosphere is of a natural origin, including marshes. However important quantities are now also released from landfill sites and animal stock and these need to be curtailed.



# On course for cutting your carbon footprint

**Reducing carbon emissions is vital and greenkeepers and grass have a pivotal role to play.**

Climate change is a big debate and people ask 'is it occurring, yes or no'?

Over the years, travelling around the world, Director of Seed Research at Rigby Taylor, Brian Robinson, reports more and more evidence that it is happening.

So how do clubs maintain their facilities in the best way possible while having regard to the

amount of carbon dioxide they are producing?

Brian Robinson said: "For the industry, BIGGA and individual clubs dramatic changes in weather patterns are putting increased pressure on everyone.

"We need to produce good conditions 365 days of the year and presentation demands are increasing in all sports, whether it is golf or soccer."

And it is here the small grass seed has a vital role to play, offering considerable benefits in relation to reducing the carbon footprint.

## GETTING TO THE ROOT OF THE MATTER

A dedicated programme of field trials by leading grass seed breeder Top Green has revealed that increased root mass is a key to CO<sub>2</sub> capture and sequestration.

Grasses contribute to carbon sequestration through the development and decomposition of leaves but the root system is also vital.

Grasses have fibrous root systems with an average dry root mass of 1,5 kg per m<sup>2</sup>, which represents about 70 percent of the total plant mass\*.



\*Effect of management intensity on sward productivity of a permanent meadow Stypinski P. Mastalerczuk G. 2002

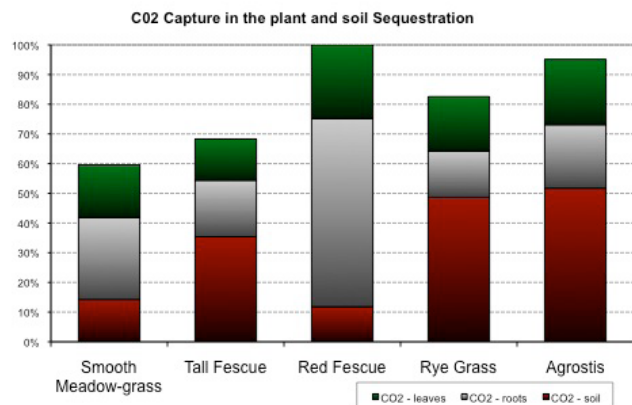
## TOPICAL TRIALS

A current seed breeding programme at Les Alleuds in France by Top Green, in liaison with UK seed agent and supplier Rigby Taylor, is taking into account the amount of carbon each grass plant species can capture.

Brian Robinson said: "This will help clubs and councils to select seed which is most beneficial to the environment."

By increasing the capacity of grass to take in CO<sub>2</sub> emissions through the use of ecologically important grass mixes Rigby Taylor is now looking at the formulation of new mixes. These have been specifically designed to actually improve the take-up of CO<sub>2</sub> emissions, Brian added: "And we will be putting markers on a new Top Green range of grass seed mixtures clearly identifying each species' ability to capture carbon."

This will considerably aid managers in adapting sustainable landscape methods in order to reduce their carbon footprint.



DEMONSTRATING AMOUNT OF CARBON LOCKED IN BY VARIOUS GRASS SPECIES.

# HOW LOW MAINTENANCE GRASSES ARE REDUCING CARBON EMISSIONS

By Maureen Keepin

Two highly emotive subjects are climate change and the impact on the environment from carbon emissions. And turf grass breeders are seeking solutions to these by introducing cultivars with slow re-growth characteristics and reduced clippings yield.

Helping to reduce the impact upon the environment these grasses are proving vital and grass seed development manager at Rigby Taylor, Stephen Denton, said: "This is an important factor clubs and councils should consider when selecting mixtures for use on areas that are either difficult to maintain to a given standard or involve high machinery use."

Grass is vital to our wellbeing. Through photosynthesis, turfgrass and other green plants take in carbon dioxide and water. Using the power of sunlight, the plants then release oxygen back into the atmosphere. Scientific studies have shown that 25 square feet of turfgrass can provide enough oxygen for one person for an entire day. And impressively golf courses can provide enough oxygen for an entire neighbourhood.

## CLIPPINGS YIELD

Clippings trials undertaken at Top Green's trial station in Les Alleuds France have been looking at how reducing clippings and the subsequent reduction in mowing frequency can affect carbon emissions.

Looking at both high and low Nitrogen input situations; yields were collected, measured and recorded. Results taken from the two situations revealed that an average clippings yield of 6.5 tonnes was produced per hectare of area.

There were significant variations between both species type and variety. The graphs below demonstrate results from the trials carried out.

These two tables look at an Environmental impact study on clippings yields both for individual species and a mixture.

It can be seen from table 1 that tall fescue produces over nine tonnes of clippings whereas perennial ryegrasses produce under four tonnes. A mixture produces about 6.5 tonnes.

While tall fescues produce higher than average clippings yields, benefits from their exceptional drought tolerance and reduced water consumption requirements of only 25mm of water per annum need to be considered for future water conservation needs.

In table 2 we looked specifically at ryegrass varieties and found that Greenflash produced

2.27 tonnes of clippings per annum, the lowest amount of clippings of those tested.

The worst varieties produced 7.32 T/ha.

The best variety in trials Greenflash produced 1.56 T/ha.

The difference between the best and worst varieties was 5.76 T/ha.

As it costs on average £40 per tonne to dispose

