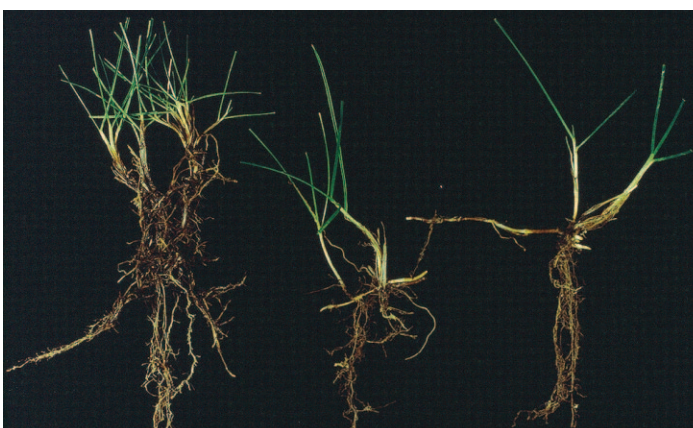


Variety is the Spice of Life

While the use of fescue in Denmark has been making the headlines, Danish grass breeders have continued to develop other varieties which they feel have golf applications. Miranda Chambers reports on the work being carried out.

The main objective in the management of golf courses in Denmark is to achieve sustainability, where the management and use of golf courses relies on the conditions of nature. This means low input of fertilisers and irrigation with little or no use of pesticides. Sustainability has been defined by the R&A as: "Optimising the playing quality of the golf course in harmony with the conservation of its natural environment under economically sound and socially responsible management".



Comparison of three different red fescue types

In order to achieve "sustainability", grasses are managed according to which species are wanted on the green thus offering different options. These include a mixture of fine fescue or fine fescue and *agrostis capillaris*, or more recently *agrostis canina* (See recommended mixtures later). Fertiliser and mowing required would be 40-80kg N/ha/year and 4-6mm. Alternatively *agrostis stolonifera* as a straight would require 150 - 200kg N/ha/year and a mowing height of 3-4mm.

Fescue is the most sustainable grass used on Northern European golf courses and Denmark has featured heavily in its promotion. This style of management was recently debated during Harrogate Week 2006 where issues such as the relevance to this programme in the UK, the influence of existing and future legislation, budgetary constraints and environmental concerns were discussed. Chris Haspell, Course Manager, Horsholm GC in Denmark, spoke about the use of fescues in Denmark where 50% of clubs have introduced the grass.

In general the aim of management is to provide optimal growing conditions in order to avoid using products to repair damaged courses due to inferior practice. Restrictive irrigation and feeding is used to control the growth of *Poa annua*. Good quality, healthy greens are promoted as the main goal.

The aim of grasses on fairways should not be to be kept green all year round but to follow the natural variations over the year.

HOW ARE WE TO ACHIEVE THESE OBJECTIVES FOR SUSTAINABLE MANAGEMENT?

A great deal of focus is being placed on the breeding of main species; *Festuca rubra*, *Lolium perenne*, *Poa pratensis*, *Agrostis capillaris* and *Agrostis canina* as seen at DLF Trifolium's breeding station in Denmark

"We are concentrating on the following areas for all species: high turf quality all year around, high tiller density, therefore more competitive varieties than *Poa annua*, high resistance to most common diseases, like red thread and fusarium, and good colour, not yellow especially under low

input nitrogen regimes and persistency," explained turf breeders, Niels Christian Nielsen and Niels Roulund.

"Grasses should be able to survive many years. Wear resistance is important, particularly for perennial ryegrass," they added.

CHARACTERISTICS OF TURF SPECIES:

Perennial ryegrass (*Lolium perenne*): New generations of perennial ryegrass have very high tiller density with very fine leaves. They have started to be comparable to strong creeping red fescue but with much better wear resistance. They are easy to establish as well.

Strong creeping red fescue (*Festuca rubra rubra*): New, improved varieties have much higher tiller density and improved turf quality with finer leaves than older varieties. The stolons create a dense mat which can be instrumental in closing up damaged sod. The newest varieties have better resistance to red thread and winter fusarium.

Slender creeping red fescue (*Festuca rubra litoralis*): This species has a very high shoot density and excellent turf quality especially during summer months, where it has good growth even during dryer periods. High tiller density results in an increase in thatch production which has to be removed by verticutting to keep the turf in good growth and free from disease. Compared to chewings, slenders have a higher susceptibility to red thread and fusarium.

New slender creepers like Cezanne can tolerate mowing at a cutting height of 5-7 mm very well. Fescues on greens are generally much healthier than bent grasses and easier to maintain with less demand on verticutting and sanding.

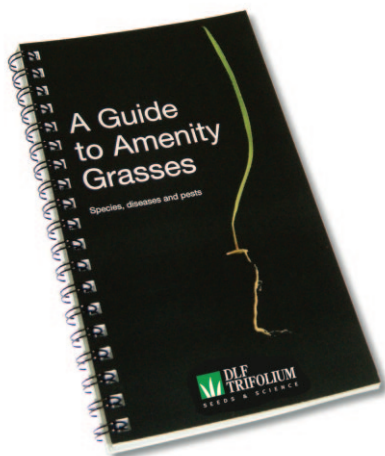
Chewings fescue (*Festuca rubra commutata*): This species has very good shoot density with the best turf quality during spring and autumn. Chewings fescue is less susceptible to disease than slender creepers and therefore more forgiving with a low management regime. The tolerance to low mowing is as good as slender creeping red fescue.

Chewings fescue is very well suited for mixtures with slender creeping red fescue for greens and fairways.

Smooth stalked meadow grass (*Poa pratensis*): Smooth stalked meadow grass is traditionally slow to establish but when established it produces a high quality turf. Wear tolerance is very good, making it suitable for use on fairways and tees. Smooth stalked meadow grass is able to spread underground with the aid of rhizomes and thus fill divots. It knits



Niels Roulund



Examining Microcover



"What strikes me is the weed free fairway and rough." Per Knudsen

together well so that whole plants are not easily removed in divots, therefore has good use on tees. Smooth stalked meadow grass tolerates mowing heights down to 13-40 mm very well. Some varieties are susceptible to *Dreclera*. It is common to see yellow rust in late spring and autumn but the grass is not killed. Mildew may be seen during the same periods.

Browntop (*Agrostis capillaris tenuis*): Historically browntop has been the major component on greens due to its ability to tolerate low mowing. In Denmark it is normally used in an 85:15 mixture of red fescue and browntop.

SEED MIXTURES

Traditional mixture:

- 45% slender creeping red fescue
- 40% chewings fescue
- 15% browntop bent

Modern overseeding mixtures:

For overseeding purposes bent and fescue mixtures are best sown separately due to the dramatic difference in seed size.

Straight fescue mixtures are especially useful for early and late season renovation of greens tees and fairways because of the larger seed size. This mixture is best sown by direct drilling into the surface at a depth of 4-6mm.

J Fescue

- 25% Carioca chewings fescue
- 25% Musica chewings fescue
- 25% Barpearl slender creeping red fescue
- 25% Cezanne slender creeping red fescue

Straight bent mixtures can be used to renovate worn greens once soil temperatures have risen. They are best broadcasted onto the surface with a top dressing. This is true for traditional bent mixtures and the new cultivars of *Agrostis canina* like Villa which are best sown as a straight.

Greenmaster

- 75% Manor bent
- 25% Heriot bent

With proper management a very nice playing surface cut at around 5-6 mm, can be obtained. A level of management, including verticutting and topdressing is needed. Due to the milder winters *Fusarium* and other diseases occur from late October onwards until winter frosts commence. Input of nitrogen in Denmark is not as high as other countries.

Growth of fine fescue is kept at optimum level which prevents *Poa annua* appearing.

Creeping bents (*Agrostis stolonifera*): Some top level golf clubs are using creeping bents on their greens obtaining a lovely playing surface under a high management regime, which most clubs cannot afford. The turf quality is excellent but the Danish climate means that good greenkeeping is needed to address the weaknesses of creeping bent thatch buildup and the susceptibility to *Fusarium* in autumn and winter, which can be a very serious problem.

HOW DO WE SEE THE DEVELOPMENT OF GOLF COURSES CHANGING AND ARE WE ADAPTING OUR BREEDING TECHNIQUES ACCORDINGLY?

As the development of golf courses demand greater emphasis on sustainability, the use of species and breeding for abiotic stress tolerance (drought - cold), disease resistance and low input will become even more important. DLF Trifolium has already addressed the issue of low cutting management of fescues with cultivars like Cezanne slender creeping red & Musica chewings fescue, in order to use these species on greens instead of high input bent grasses especially creeping bent.

Development of microcover is an interesting concept and offers an alternative "green" nitrogen source which could be especially attractive on golf courses in semi rough areas.

"What strikes me is the weed free fairway and rough we have achieved after the microcover mixture has been established. We look forward to this continuing. A fresher, greener colour is visible with less input required. On the tees I have noticed the clover closes up the gaps quickly by the dense spread of stolons," said Per Knudsen, Greenkeeper, at Viborg GC.

By having turf trials in countries where conditions affect trials every year eg low temperature and snow cover in Poland and heat and drought in France, breeding can focus on testing for abiotic stress. The same applies for diseases where trials are performed in areas where these diseases are seen regularly e.g. crown rust in France, red thread in Denmark and the UK, *Fusarium* in Poland and Denmark, brown patch and gray leaf spot in Maryland, Kentucky USA.

"Our programme has a major advantage compared to our competitors as we have a multi location testing facility and therefore tests for abiotic and biotic stress are more accurate," explains Niels Roulund.

"Since it is very difficult or impossible for one variety to be resistant to all possible diseases we hope, with the resources of genetic engineering, to obtain a general disease resistant strain which would save the environment a lot of fungicides - and ultimately gain permission to use this in the market place. In areas where insects are a problem we are working hard to identify specially effective strains of endophytes which are living in symbiosis with *Lolium* and *Festuca*."

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