The search for a Super Grass

Cross-fertilisation of plants: looking to the future

If you thought growing grass was a complicated business, think how hard it is for the people breeding the seeds. They have to think what greenkeepers will want in 15 years' time...

In an ideal world there would be one type of grass – super grass. This grass would suit every application and climate. It would cope with close mowing. It would be resistant to all diseases. It would be as at home on front lawns and football pitches as golf greens. And it would taste nice (at least to cows and sheep).

But grass is used for so many different purposes that breeders have given up searching for one super grass and are constantly trying to improve grasses for specific purposes.

This search is carried out throughout the world... and it could lead a breeder to your golf course. Old British golf courses are a great source of excellent grasses because they're used to close mowing and heavy traffic.

Barenbrug's Barkoel (Koeleria macrantha), launched last year after extensive trials in Scandinavia, New Zealand, France, Germany, Switzerland, Holland, the USA and the UK, is one example of this.

"The original breeding stock for Barkoel was located by chance on an old British golf course," says Michel Mulder, Barenbrug UK's managing director. "Despite drought conditions and infertile soil, certain very attractive green grassplants were found to be thriving whilst others suffered.

"This highly successful species was crested hair-grass, a grassplant common to many dry and sandy areas. A major programme of breeding and development followed, finally resulting in the uniform and stable variety of Barkoel, which was registered on the STRI list in 1994."

Between the first find and the launch, 21 years elapsed. Normally the process of developing a new variety takes 10-15 years and the quickest it's been done is about eight years.

Barenbrug's breeders make a collection of new material each year. The crested hair-grass was collected in 1973 from a course which Barenbrug want to keep secret. "When you collect on old golf courses you can collect material which is already used under good conditions," points out Gerard van't Klooster, head breeder at the Dutch company's main research centre. "The collection was made for more normal amenity grass species like red fescue and bent grasses, but the Koeleria looked very good and was also taken away."

Back in Holland the grassplant was split in three and planted in a turf trial the next year. Its performance was "very good", so the breeder decided to harvest seed from the best plants. He split the good clones again and planted these in small plots in a field. The trial plots are separated by rye, which prevents cross-fertilisation.

Harvesting the seed from grasses takes at least a year – you have to plant in the late spring to have a harvest the next summer.

The year after the harvest the new selection was used in another turf trial and the performance was monitored for three years.

Before a new variety can be released on the market, the breeders have to make sure that the fifth generation is the same as the first.

The tests, which included using a wear machine and close mowing, showed that Barkoel was excellent under short mowing without irrigation and without fertiliser. Mr Mulder says: "It provides an extremely dense turf, and very fine leaves which maintain an attractive green colour under the worst conditions. It has outstanding drought tolerance and remarkable disease resistance and can withstand very close mowing (under 2cm)."

In 1987 Barenbrug applied for Plant Variety Protection in the USA and in 1990 they made

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the application in Holland. On May 4 1994 Barenbrug was granted the plant breeder's rights (a bit like a patent) for Barkoel, the first time these have been granted for a variety in that species.

Intensive testing has shown that Barkoel is best suited for fairways and semi-rough when used with other species, such as red fescue and browntop bents. It has also been tested on greens at the STRI's base at Bingley and at the Bristol and Clifton Golf Club, where former head greenkeeper Huw Parry says "it came up well".

But as companies like Barenbrug produce more and more turfgrass cultivars – and they have 610 varieties in their 'Fort Knox' in Holland – the already difficult task of choosing the correct cultivar for a particular project becomes harder. One tip, though, that most seed companies agree on is: don't buy on price alone; in the long run it will pay to buy good quality seed. Poor varieties offer no persistence under continuous wear, will require constant mowing, and be more susceptible to disease.

When you know how long it takes to breed a new variety and what goes into it, and you realise that after years of cross-fertilisation, testing and multiplying only a very small percentage of new grass varieties reach the stage of marketing, you wonder how they can produce a 25kg bag of greens mix for £150.

Top of the poppies: Duke's Dene golf course has been created out of chalky North Downs farmland

Choosing seed mixture for a new course

The cost of grass seed for a new course never amounts to more than one or two per cent of the total cost of construction, and yet often the seed is judged purely on price rather than quality.

When considering what type of mixture to sow, probably the most important factor is the choice of cultivar and the percentage of each variety needed to achieve the best results. The buyer has to identify the quality of turf he is looking for and then obtain a good balance of varieties that blend together to give a hard-wearing and close-knit sward.

Jonathan Franks of British Seed Houses advises new golf courses to consider all the

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options:

"The first consideration should be soil type. When putting forward a specification, I always like to visit the site, and get a feel for the course. I can also obtain a soil analysis where necessary," he states.

"The next question to ask is about the type of course being planned – will it be a private course with limited membership, or a pay-as-you-play public course, where harder wear is anticipated, in which case a ryegrass-based mixture may be more appropriate?

"Environmental considerations are also very important. In all cases, the relevant local authority, as well as environmental groups, will be keen to see native wild flora and grasses sown, in the roughs and areas surrounding the course.

"Most course managers and greenkeepers want a good, strong rooting, close-knit sward that is quick to establish, and able to withstand likely wear in both the summer and winter seasons."

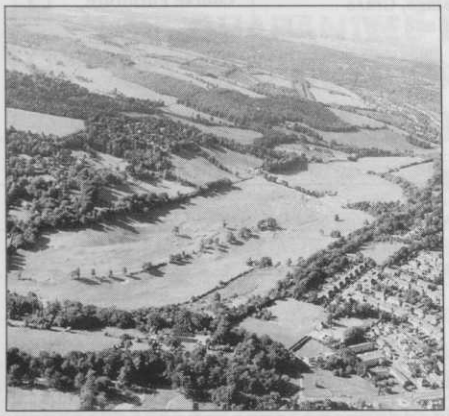
He says a typical fine turf mix for golf greens would contain between 70 and 80 per cent fescues, and 20 to 30 per cent browntop bent grasses, depending on such variables as soil and climatic conditions, the amount of likely use and wear, and type of course being planned.

The fescue content of the mix can be made up of chewings fescue, with a proportion of slender creeping red fescue to help give a good coverage. A blend of two bent grasses can be included, to encourage better all year round performance.

The top-rated cultivars of both fescue types will withstand close mowing at 5mm on greens; mixing them combines the greater drought tolerance of the slender creeping red fescue with the greater disease resistance of the chewings fescue.

For golf tees and fairways, the slender creeping red fescue content can be increased, and the bent grass content reduced accordingly, to provide a more hard-wearing sward that will recover quickly from damage caused by divots or heavy traffic.

"Seed mixtures have several advantages over individual cultivars as long as they are carefully selected, and can be blended to provide everything the course requires, from a smooth putting surface to an even fairway," adds Jonathan.



Sky high: Robert Brewer's unique view of his course

Jonathan Franks and course manager Robert Brewer on one of the Duke's Dene greens

One of the newest golf courses currently undergoing the final stages of construction in the south-east of England is Duke's Dene Golf Club, at Halliloo Valley, Woldingham in Surrey.

Set in an attractive valley covering around 160 acres of chalky North Downs farmland close to the M25 corridor, Duke's Dene is the first golf course development in Europe by the Japanese company Mizno-Gumi Co.

The architects are David Snead and Bradford Benz of California- based Bradford Benz Golf Course Architects. Of over 100 golf courses they have designed around the world, this is their first course in the UK.

The planned 18-hole, par 71 championship course of 6417 yards was entirely sown from June onwards by landscape and golf course contractors Brian D Pierson of Wimborne, Dorset, using two special British Seed Houses mixtures, one for the greens, and one for the tees and fairways.

These were based on blends of chewings fescues, slender creeping red fescues, and browntop bent grasses, and were accepted by the architects as the best option to provide the fine grass types required by a championship course, and to blend in with the existing natural environment.

Newly-appointed course manager Robert Brewer, who was previously assistant course manager at Sunningdale, has been impressed with the look of the new course in the short time since his appointment in early September.

His is a unique view, too – he holds a pilot's licence, and was able to take his own aerial photographs of the whole course soon after he started work.

"The greens germinated within two weeks, and good coverage was achieved within six to eight weeks," he says.

"The tees were quick to establish, too. Our only problem has been the fairways, but that's been due to irrigation problems and the dry summer – now solved by our new underground reservoirs.

"Quick establishment on the greens means we have been able to prevent the spread of *Poa annua*. On the fairways, regular mowing means the grass is now beating down the natural weed population.

"We've had to spray a selective herbicide on all the fairways, and we will be reseeding specific areas in the spring, but otherwise it all looks fine.

"Basically I want grass that will help the ball sit up well on the fairways, and be hard wearing enough to cope with trolleys and other heavy wear. On the greens, it has to withstand regular mowing and give a good, true putting surface – simple, really!"

There are also plans to sow an area of wildflowers, close to the 8th and 17th tees, again using a British Seed Houses wild flora seed mixture. This is designed to help preserve and enhance the natural landscape, particularly those areas which had to be cultivated during the ground preparation phase.

"We have adopted a deliberate policy on the valley sides to leave the natural vegetation intact, including a good percentage of the existing wild flora," says Robert Brewer.

"We will also be planting around 2500 trees and shrubs, as well as 10 mature trees over the winter. Once this has all been done, we will have a much better picture of what the course will look like when we open for business in June."

● Dr David Patterson, a turfgrass breeder at the Northern Ireland Horticultural and Plant Breeding Station, will be talking about plant and grass breeding in a seminar at BTME on January 26, 11.30-12.00.