



look long and hard at their designs so there are now plenty of machines to choose from with a host of benefits that are aimed to make the job efficient, cost effective and easy.

Regardless of whose name is on the label the modern fairway mower normally has a diesel engine, hydraulic transmission and drives plus power steering. Generally cutting configurations are similar and made up of three or five units. Ergonomics have played an important part and features such as all round visibility, fully adjustable

seat and driving column are common.

The cutting units are fully floating, ground hugging with usually a choice of 5, 7 or 11-bladed reels.

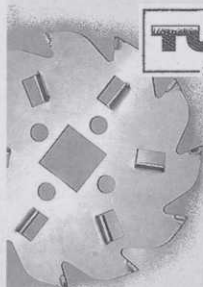
Other types of options offered depending on the make include grass catchers and interchangeable units for scarifying, verticutting and brushing.

Electronics are now becoming a key feature especially in diagnosing a fault in the engine or hydraulic system and these can save a lot of down time trying to locate the source of the problem

On the question of maintenance the

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things to look out for are accessibility to all components especially the reel units. If you are considering buying alternative reels it is important at the demonstration to ask the operator to change these over. You can then judge how easy it is and the time it takes. This is also a good time to ask about the availability of replacement parts.

The rough

The semi rough defines the point where the fairway merges with the rough and its width will vary between courses. The cutting height needs to be no more than about 60mm and should be carried out regularly with the gang type mowers so there is a clear indication where the deep rough begins.

When it comes to heavy rough the type of mower used will differ from course to course. As the vegetation is going to be left relatively long (about

10cm) the machine has to be able to cope and a rotary or flail could be the best answer. How many times and at what intervals will largely depend on the plant life. In the case of heather to promote formation of young growth and to stop it becoming leggy it will require mowing in the autumn.

On courses where wild flora is being sown and encouraged then the management programme is different depending on how long it has been established. In the first year it needs to be cut and collected regularly at height of 5cm and 7cm throughout the growing period. In the second year and following seasons the first flush of spring growth should be mown and the cuttings removed. Continue until late May when the mowing should cease to allow the flowers to bloom. When flowering declines towards the end of the summer mow and collect again. Further cuts can be carried out

until October.

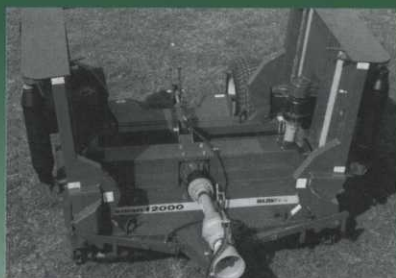
For flower management a rotary or flail with collecting facilities is a must, otherwise the clearing operation is extremely labour intensive. This type of machine is not only useful for this job but it can be used also for collecting leaves. There are a number available and the main thing to look out for when having these demonstrated is their ability to collect in wet conditions. Otherwise in the present climate you are going to be faced with either not being able to cut, or continually having to unblock the machine.

Where the rough is made up predominantly of grasses then the rotary is an alternative to gang mowers. There is a variety of cutting widths to choose from either as tractor-mounted or shelf contained units. During the last decade we have seen the introduction of wide trailed rotary mowers made up of cutting units which are independent of each other, so they are able to follow the ground contours closely. Again they are worth checking out if the terrain is difficult with scalping often occurring.

Another alternative is to let areas naturally develop, but these will require some controlled management. If they do need thinning out or some cutting, then the new spate of ride-on brush cutters are suited because they can deal with relatively heavy brush wood and saplings.

The fact that the fairways and adjoining rough account for the biggest areas to maintain means the equipment has to be fast and cost effective. What is suitable for one course is not necessarily the right answer for another. With mowing areas of this size there are a host of variables to take into account, so before changing from one method to another carefully analyse all the pros and cons - then look at as many machines as possible before deciding.

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**Victor Jamieson gives some advice on
the purchase of a new irrigation system**

Splash out

Thinking about a
new irrigation system?

Looking back over the past nine months it is hard to imagine an irrigation system ever been used in this country again. However, not so long ago we were talking about drought conditions, water shortages and restrictions. Hot dry summers are sure to come again and when they do golf clubs with old irrigation systems will very quickly realise their inadequacies. With an ageing irrigation system the greenkeeper will be forced to spend more and more time trying to keep the system going and having to hand water to make up for its poor performance.

Comparisons will be made between the condition of their course and the course next door that was installed with a state of the art irrigation system a few years previously. An efficient irrigation system is not only an insurance policy against dry weather but also an effective management tool to help with the control of divots and overseeding etc., enabling greenkeepers to improve the overall condition of their course.

At some stage the club will have to make the decision to install a new system and this will probably be one of, if not the largest, capital expenditures they will ever make on their golf course. Once they have decided to go ahead there are many considerations

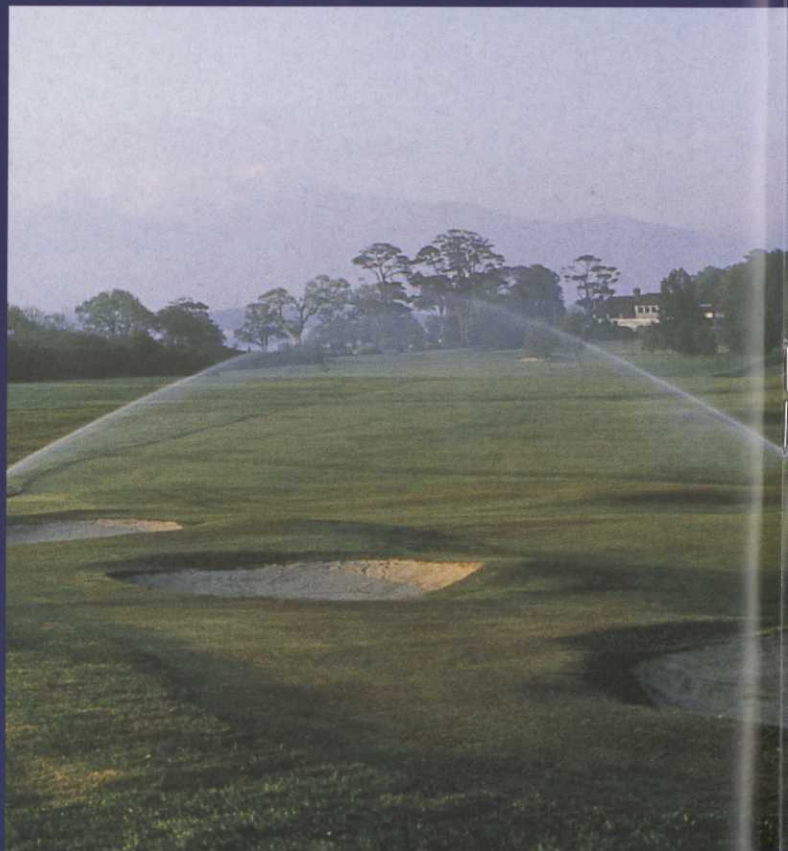
to take into account and various options open to the club as to how they should proceed.

They can employ an irrigation consultant to take care of the project from conception to completion, or the consultant can prepare a specification to be issued to contractors to bid on a design and build basis. The consultant can then be used to make a comparative analysis of the submitted bids with a recommendation as to how the club should proceed.

Another alternative is for the club to proceed alone without professional advice. This is not the easiest of routes and one that should only be taken if the club is prepared to do its homework, considering the enormous costs involved.

Continuous research and development ensure more advanced and high tech materials and equipment are available to the irrigation contractor. These days a well designed, well installed and properly set up irrigation system should be relatively maintenance free. Leaks should be a thing of the past and greenkeepers can undertake their normal maintenance operations without the risk of damaging equipment and materials.

To select the most appropriate irrigation system for your golf course certain decisions must be made. The club should decide on the following:





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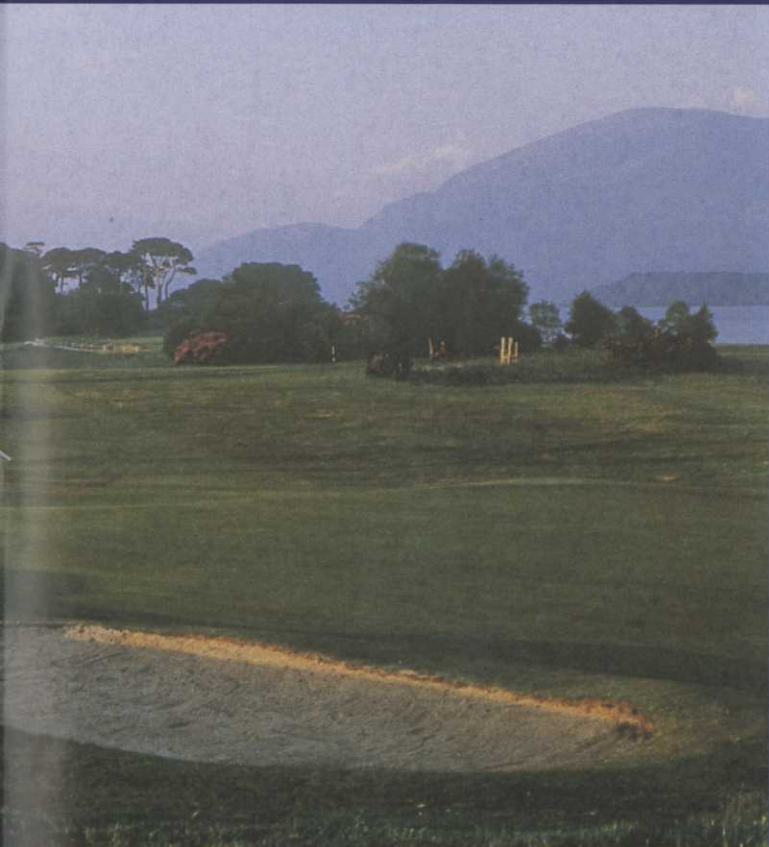
In addition to providing the latest, simplified desk-top control technology, the Toro 'GT' Update Package ('GT' stands for Gemini-Trident) enables you to exercise better flow management, the key to reducing water consumption. It also eliminates the risk of over-watering and ultimately, helps cut the cost of your club's water and electricity bills.

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- Which areas of the golf course need to be covered by the irrigation system eg, greens, green surrounds, tees, approaches, fairways, carries, walkways, bunker surrounds, areas prone to wear and other areas such as turf nurseries and landscaped areas.
- Maximum design application rates. This is the amount of water that the system should be able to deliver to the selected areas of the golf course within the irrigation-operating window, normally in mm/day or mm/week.
- Available irrigation window. This is the length of time the system will need to be operated to apply the chosen application rate. In the UK this is generally eight to 10 hours. It is useful to bear in mind that the shorter the irrigation window requested the more expensive the irrigation system will be. For an eight-hour operating window the system will require a larger capacity pumping system and larger pipework than for a 10-hour window. Once these have been decided the club can go into further detail and decide on:
 - Type of coverage. Part or full circle sprinklers on the greens and approaches, single or double row on fairways and tees etc.
 - Sprinkler type. Valve-in-head or non valve-in-head controlled in blocks.
 - Sprinkler control. Individual head control or sprinklers controlled in pairs/block.
 - Control system. Wall mounted stand-alone controller or PC controller. Remote control facility. Weather station etc.
 - Pumping system. Pressure or variable speed set.

Usually the club will have limited funds available and although they may wish to install a wall-to-wall irrigation system immediately this may not be financially viable. This does not mean that the golf club cannot have what it wants in the long term as long as it is taken into account in the initial design.

For example a system can be designed to initially irrigate greens, tees and approaches but the irrigation mains and electrical control system can be sized so that the system can be extended at a later date to irrigate other areas of the golf course e.g., fairways. The pumpset can be designed and fabricated in such a way that an extra pump can easily be fitted to provide the required extra duty. In this case the club can add fairways one at a time as funds become available.

Before approaching contractors the club should find out how much water they have available, as this will dictate the size and area that the irrigation system will cover and they should have a budget figure in mind. The club should research other clubs that have had a new irrigation system installed. They should also examine the workmanship of the installer, quality of reinstatement etc, and short list a number of contractors that they would like to bid on the project. Impartial professional advice is advisable and considering the huge costs involved, the club

should satisfy themselves that the advice they receive is appropriate.

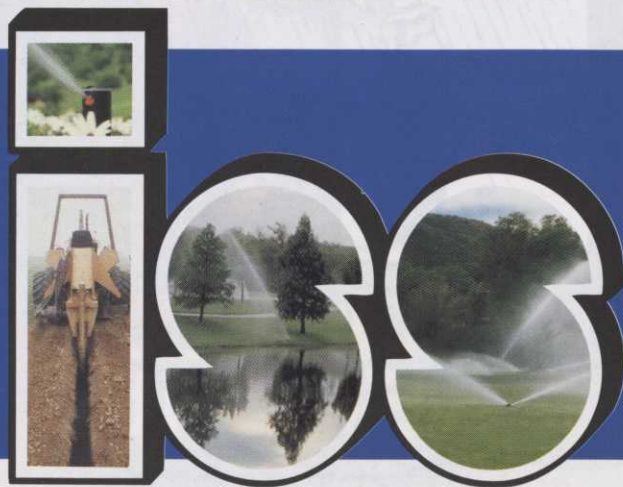
If a consultant is not involved, the club should make sure that the contractors they select bid using the same criteria as listed above. In addition they should ensure that materials offered meet or exceed appropriate standards. With regards to installation, the club should make sure they know how the irrigation system is going to be fitted, to what depth pipework will be installed and how reinstatement will be carried out. Guarantees and warranties should be examined and the club should make sure that the contractor has allowed for the system to be set up and commissioned fully. Make sure the contractor's bid has included for as-built drawings, spare parts, tools and training etc.

A club should always install the highest quality, most sophisticated system it can afford. The investment will quickly reflect in the improved quality of the course enhancing reputations and revenue.

Don't forget irrigation is as important to golf courses as central heating is to houses. Not necessarily essential, but without an efficient system conditions are uncomfortable and inferior.

Victor Jamieson is Rain Bird Area Manager for UK and Ireland

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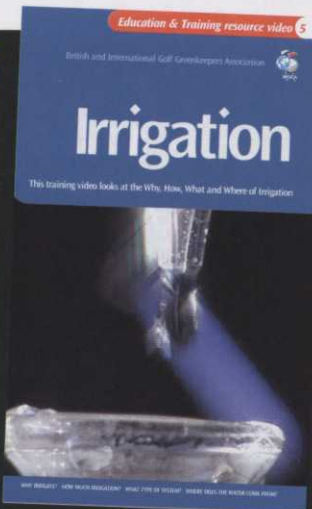
NEW

The latest in learning resources from BIGGA

The fifth in the series of BIGGA Training Videos - Irrigation - was launched at BTME 2001.

Although it may not have been apparent in recent months, water is a precious resource and extraction is becoming increasingly difficult and expensive. At the same time irrigation is a vital tool to the greenkeeper and the 28 minute video looks at using it to its best advantage with the Why, What, How and Where of irrigation.

The video features interviews with recognised experts in their field, graphics and film showing why irrigation is needed, when to apply and what equipment to use. "This video is not only of benefit for training greenkeepers in the art of good water management and irrigation, it would also be very useful for communicating to the wider golfing community," said BIGGA's Education and Training Manager, Ken Richardson.



The other four videos in BIGGA's portfolio cover, spraying; golf course preparation; golf green construction and golf course ecology. The production of this video was only possible through the generous support of the Association's Golden and Silver Key Supporters who donate to BIGGA's Education and Development Fund. Irrigation is produced by Goodwood Videos, who also produced the Golf Course Ecology video, and is priced at £14.95.

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David Rhodes explains how to achieve the best results from the time, effort and money invested in sward renovation

Testing times

How you can improve your turfgrass

These days, greenkeepers are being asked to provide good playing conditions seven days a week, every week of the year. This continual wear and tear, in increasingly wet conditions, is bound to affect the quality of the grass surface at strategic points across the course. Deterioration may also result from excessive thatch accumulation, a predominance of undesirable grass/or weed species, excessive shade, or injury due to pests and disease. Improving the sward by laying new turf or overseeding will often be the only answer.

In most situations, unless an instant surface is required, overseeding will be cheaper and more practical than putting down new turf. Although less demanding in the initial phase of establishment, turf limits the choice of species and cultivar to that used by the turf grower, and this may not be the ideal match for the course.

With over 200 amenity grass cultivars on the STRI List, the possible combination of varieties and species that can be sown in a repair, or overseed mixture, is endless. Trials at our research station in Lincolnshire, repeatedly show that mixtures out-perform the individual varieties grown on their own - especially with regard to density, colour and disease resistance. Considerable time and effort is taken to devise mixtures to suit a particular end-use. These do not necessarily include all the best-rated cultivars, but those that will

grow and perform well together in a specific situation.

In amenity grass breeding programmes, the primary objective is to find new varieties that will reduce labour and input costs — for example, by selecting cultivars that require less mowing, chemical sprays and fertiliser.

In Britain, important qualities to look for in grass seed selection are persistence under close mowing, durability under wear, disease tolerance, turf density, slow vertical growth rate, good winter colour, and cleanness of cut. The life of any sward, be it tee, green or fairway, is neither static nor infinite. Even areas prone to least damage, will eventually benefit from being replaced with genetically better, healthier plants. Advances in breeding continually produce new varieties with superior characteristics to those already available.

Sow quality seed

Good quality seed is essential for successful establishment. The three basic components of quality are purity, viability (germination) and trueness of type. Quality seed must confirm to UK seed labelling laws. For example, the Higher Voluntary Standard for purity in rye grass is 98 per cent, and for fescues is 95 per cent.

Seed size and weight are important characteristics associated with

seedling vigour, both between, and within species and cultivars. For example, rye grass has greater vigour than bent grass. The relative vigour of seed lots can be obtained from the interim germination on the seed test certificate. Lots with a high interim germination, which will be similar to the final germination, have the highest vigour.

Seed numbers per kilogram differ widely for different species. With large seeds like those of perennial rye grass, there are less seeds per gram than for bent grasses. Therefore more weight of seed is required to achieve the same plant numbers. Achieving the right sowing depth is critical, which for most turf-grass seeds ranges from 1.25mm to 6.5 mm. Seeds sown too deeply may not germinate.

The type of grass, soil conditions, planting depth, germination percentage, seedling vigour and the level of post planting care, all determine how much grass seed is needed. The target should be a living count of between 10,700 and 21,500 plants per square metre, to ensure rapid establishment of a thick, dense sward.

When to sow?

Turfgrass renovation programmes need to be planned to ensure the various operations progress in a systematic manner, with minimum disruption to players. Cool season grasses are usually sown in late spring and early autumn, with an optimum

Testing times

HERE ARE THE RESULTS

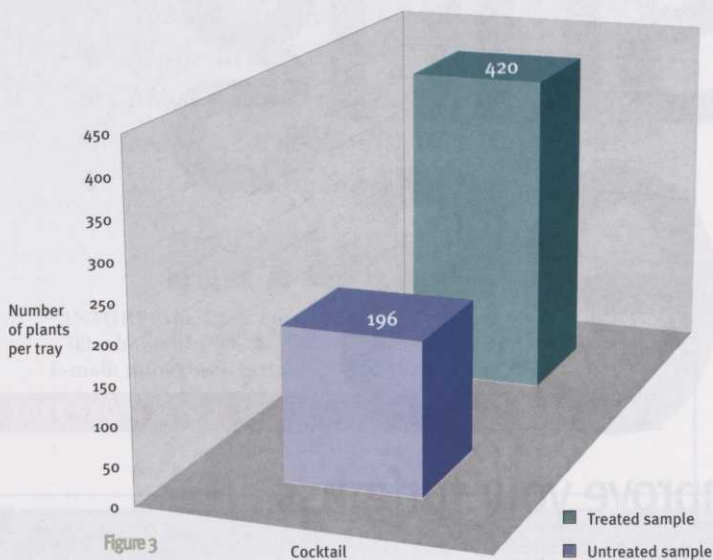


Figure 1 shows how the seed treatment speeds up establishment in a perennial rye grass/red fescue lawn mixture, sown at Advanta's Lincolnshire research station in September 1999.

In figure 2, trials carried out in glass houses in Holland, demonstrated that more than twice the number of plants established with the treated sample.

Finally, figure 3 displays the results of mixtures trials carried out by several Dutch turf growers during 1999. The greatest difference is seen where smooth stalked meadow grass was grown with creeping red fescue, rather than with perennial rye grass where the meadow grass suffered from the much fiercer competition.

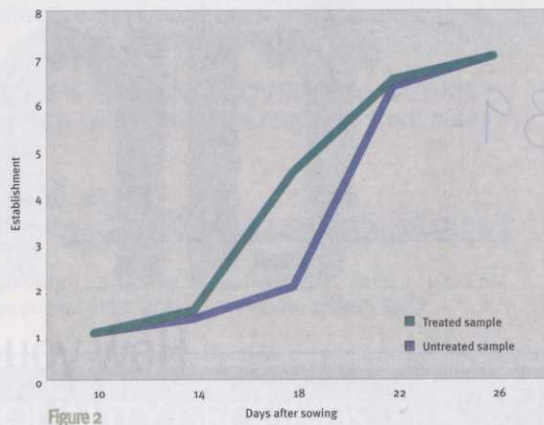
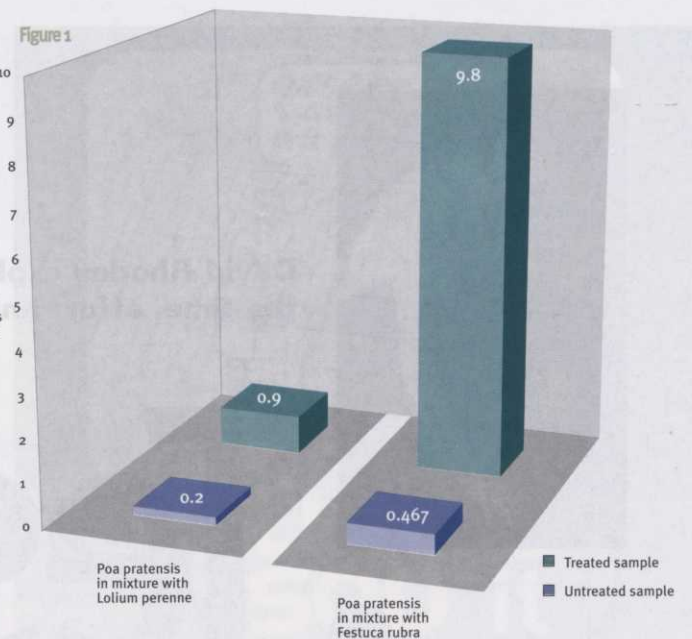
temperature for seed germination of 16 to 30°C. September is usually the ideal, providing moist, warm conditions, allowing new plants to establish well enough before day length shortens. Competition from annual weeds and existing grasses is also less at this time.

The continual heavy rain and flooding experienced by many last autumn, means there will be more spring renovation going on this year. The best advice is to aim for mid-April seeding, as soil temperatures should have risen high enough to allow germination.

How to sow

The sequence of operations includes site preparation - ie weed and thatch control, mowing, aeration and nutrition, followed by the selection of appropriate seeds, sowing, and post planting care. The surface should contain at least 60% cover of desirable perennial grasses. If substantial weed or non-desirable grasses are present, treatment with a non-selective herbicide may be needed first.

Thatch control is very important, and excess material should be reduced with a vertical mower, or in severe cases with a turf cutter, and removed from the site. Generally the area should be vertically cut in several directions before overseeding,



particularly when using mixtures containing bent grass as the seed is so small. All turf grasses produce lateral growth as stolons, aerial tillers or trailing stems. This lateral growth gives the appearance of complete turf cover, but in fact it may shade developing seedlings and new tillers.

Soil analysis will highlight any deficiencies in the nutrient status of the root zone, and the opportunity to apply fertiliser, particularly phosphorous, at seeding should not be missed.

Nitrogen should be withheld for three weeks prior to, and following overseeding, to reduce competition.

The seed can be applied with a spreader - with passes at right angles to ensure even distribution, or broadcast by hand. This should be followed by topdressing and watering if necessary (not last autumn!), to encourage optimum germination and growth.

Post establishment care practices need to be in place for at least four to eight weeks following sowing, and the area will be out of action for this period. Irrigation is especially important after spring sowing to avoid loss by desiccation during the summer months. The initial irrigation should be long enough fully to wet the root zone, and frequent enough to keep the area moist.

When the plants are firmly rooted, and leaf growth has reached 40 to 50

millimetres in length, mowing can start. No more than one-third of the leaf should be removed at any one time to ensure optimum growth. Mowing height should be reduced gradually over a period of one to two months, until the recommended height is achieved. Cylinder mowers can pull out newly established grass, so it is better to start off with a rotary machine.

Difficult conditions

Where greenkeepers are under intense pressure to repair key playing areas in far from ideal conditions, such as a late wet spring, an additional insurance is available from seed treatments.

These, like Advanta's own Headstart, can contain cytokinins, enzymes and trace elements. Cytokinins promote cell division, particularly in rapidly dividing cells, such as occurs during germination. The enzymes help mobilise food reserves, which are an essential source of energy in germinating seed. The chelated trace elements are readily available to the young seedling, and two organic complexes called osmotic attractants, draw available moisture to the germinating seed from its immediate surroundings.

David Rhodes is Technical Manager for Advanta Seeds UK.