Banyan GC, Thailand

routine job when one must get to work by bicycle or motorcycle, and it is understandable that one would want to have a better quality of life and a car or truck. And when we pass vast expanses of rice fields and see workers spraying insecticides and herbicides with no protective gear, we may cringe a bit, but that is commonplace in Southeast Asia and food production is a lot more important than is golf course maintenance.

When the agricultural industry spreads fertilisers and pesticides in a certain way, those working in golf course maintenance will have a hard time understanding why they should do the work any differently. If it is good enough for our food, why is it not good for the grass, the thinking may go.

People in Asia are concerned about the environment, but in my experience, the people are first concerned about improving their quality of life, and would prefer to see people from developed countries make sacrifices in their lives rather than restricting water use or golf development or energy use in Asia.

Employment Opportunities for Expatriates

I am sometimes contacted by people who are interested in working in Asia, asking me if I know of any job openings or how one might go about gaining employment here. Frankly, there are not a lot of employment opportunities for foreigners in the greenkeeping field in Southeast Asia. To take Thailand as an example, with its approximately 250 golf courses, I think there are five expatriate head greenkeepers. At Hong Kong there are expatriates in the management roles at most clubs, but then with only six clubs, that doesn't represent many jobs, does it?

To step away from Southeast Asia for a moment, we can look at Japan, where there are over 2000 golf courses, and I can say with some confidence that aside from the few American military base courses in Japan, there are a grand total of zero expatriates working as a Head Greenkeeper in Japan.

To sum it up, there are not a lot of employment opportunities available, and those that are available are usually offered to people who have already been working in Asia.

The way to get work (and the way that I found my first employment in Asia) is through new construction projects, generally, and if you are interested in working in Asia, and have some contacts with golf course architects or construction companies who are doing work in Asia, that may be an opportunity to find a job here. And once you have worked in Asia, and been successful, it is relatively easy to find another job within the region.

A Difficult Place to Grow Grass

Because the climax vegetation in Southeast Asia tends toward jungle, it is a matter of constant effort and constant vigilance on the part of the greenkeeper to keep a course in good condition. And it is particularly unfortunate that in a part of the world where the climate is so extreme and una-menable to turfgrass growth, there is also a real lack of edu-cational opportunities available for greenkeepers.

But that is changing, and local greenkeeper associations are developing to share information and provide educational opportunities to their members.

With that, I think, the greenkeepers in Asia have much in common with their counterparts in other parts of the world, and although the climate and grass and economy are all quite different from Asia to Europe to America, the greenkeepers here have the same passion for the work and the same interest in constant improvement in their skills and in the courses they manage.

A team of workers can contain around 50 people

ABOVE: Not regarded as suitable footwear in Europe!
BELOW: Caddies say, "Hi"

The architecture of grass and green speed

Tim Lodge raids his bathroom to produce visual aids illustrating his take on green speed

Golf ball on a wire brush (left) and on a toothbrush

Imagine a wire brush. Imagine the wires are as densely packed onto the brush as they are on a toothbrush but all are exactly the same length. Imagine the brush is really big, as big as a golf green.

Now imagine rolling a golf ball over that brush. Because the wires are all really stiff, up to a height of maybe an inch or more their length isn't going to have any effect at all upon the rolling ball.

Now imagine they are nylon fibres like a toothbrush and not wire. Now maybe a length of about half an inch might be the upper limit at which the roll of the ball is affected. Below this height, it's unlikely that long or short fibres will make much difference.

You can perhaps see where I'm going with this. The extent to which a rolling golf ball is affected by the grass will be related in a very important way to the density of the shoots and to other factors such as their width and their individual 'floppiness'. It's not just about height of cut. Different grass species will have inherently differing degrees of stiffness in their shoots. Rather like men perhaps, this will also vary according to other factors like the pressure of the fluids within the leaf cells, a phenomenon known as turgidity which is related to the grass's water uptake.

Different grass species will also form swards with different shoot densities. The shoot density of a fescue sward for example is totally different to a sward of annual meadow grass. The photographs suggest that the shoot density of a healthy fescue sward is actually less than that of a meadow grass sward.

The width of the leaves will also be important, particularly in relation to how much of their surface actually comes into contact with the ball. This will also affect the amount of surface moisture they retain which will in turn affect the roll. Fescues of course have much narrower leaves than bents and annual meadow grass.

The point is that the height of the sward, the mowing height, may not be quite as influential in affecting the speed of greens as is widely assumed. Unfortunately, there is a desperate paucity of research on this very important question. How does the 'architecture' of the sward, including the height of cut, affect green speed?

The necessary experiments required to answer this would be fairly easy to set up and study. If anyone was prepared to fund this research, we at Agrostis would be more than happy to carry it out.

In the meantime, we should perhaps take the heat off greenkeepers who are often forced simply to lower mowing heights in the quest for faster greens.

This places both the greens and the greenkeeper under often quite unnecessary stress. If it were more widely appreciated that the situation is more complicated than simply the mowing height setting there might be a few less argument taking place and fewer jobs being lost.

Annual meadow grass sward (left) and fescue sward, both mown at around 4 mm

Tim Lodge, Agrostis Turf Consultancy, Tel: 01359 259361, www.agrostis.co.uk

On the beach

Murray Long explains how bunker construction and maintenance is carried out at Sunningdale

Bunkers are up there alongside golf greens as one of the most emotive subjects in the bar after a game of golf, or in a greens meeting! In the same manner as golfers would say the greens were too slow, bumpy or soft, they would also say, "My ball was plugged! There was no sand! There was too much sand!" etc.

They are a hazard! Therein lies the problem; how much of a hazard should they be? Certainly not the hazard they used to be when they were formed from rabbit scrapes in the dunes or sheep sheltering from the howling wind or rain hundreds of years ago. Even on from that, at the turn of the 20th century when Harry Colt started building bunkers whose bases were not evenly bowled, bases were fluctuating and sand could never be kept evenly distributed over the bases or faces as gravity would play its part and sand levels would be inconsistent. After all, bunkers were designed as a hazard!

The modern day bunker is somewhat different. A more manicured approach has developed with edges having to be defined to clearly mark the hazard, even sand levels so that you get the same lie where ever your ball lands. The best players in golf would much rather land in a perfectly raked bunker if they miss the green, where they can get a clean strike and achieve some spin to stop the ball, as opposed to a ball sitting down in some clumpy rye where anything can happen.

With the current economic climate, things may well be heading back towards more unmaintained hazards. There are certainly a lot more golf course designs coming out of America with a more rugged appearance, but you can still be sure we greenkeepers will be put under pressure to maintain our bunkers to achieve consistency, as

Many years ago, the USGA developed a specification for a green in the search for a consistent putting surface

I have yet to hear a golfer say "It was ok, I thinned it, I was in a hazard!"

Some of the best bunkers I have at Sunningdale don't have any drainage installed. Four out of at total count of 154 lie over a free-draining sand rootzone that has little or no

ABOVE: Range of photographs showing new Course bunkers under construction

stones. This is the ideal. I wish this ratio was higher, but it does give some indication of what is needed in a good bunker!

Many years ago, the USGA developed a specification for a green in the search for a consistent putting surface.

In my opinion, we need to apply some of these principles in order to produce good bunkers that actually reduce the level of maintenance required because they're constructed well from the sub base up.

On many sites, the sub base can vary substantially across the course which will have an effect on the sands performance, so we have to create some consistency, starting with a good drainage system ideally leading to a positive outfall and adequate pipe size to maintain a reasonable flow of water to prevent flooding.

Flush points can be fitted to the drainage system by carrying the pipe up and out of the bunker to a convenient place close to the edge where it can be fitted with a cap to allow flushing prior to winter heavy rains ideally just before drain down. These flush points can also be used for rodding should blockages occur.

Another option can involve fitting a piece of twin wall pipe with a solid base into the drainage line so it acts as a silt trap.

This would also have a solid removable lid ideally six inches below the finished level of the sand to avoid damage from clubs.

They can be handy access points in times of severe flooding to get water quickly to drainage. It also helps to make them large enough to drop a bunker pump into, to act as a sump in the worst case scenario.

If a soak away is your only option, try to construct it outside the bunker with enough storage capacity to take all the water a bunker is likely to take, far enough away to avoid water backing up the pipe. Again, twin wall can be built into the soak away large enough for a bunker pump to be dropped in should it become full.

Making the sub base as solid as possible and sloping it towards drainage, ensures water can be quickly evacuated.

The biggest problem affecting bunkers is contamination. The more you can prevent it, the longer the bunker will last and perform effectively. Contamination comes in a variety of form from different

ABOVE: bunkers before and
BELOW: after re-construction

areas and there are a number of solutions.

Contamination from the sub base may cause stones, rock or chalk to mix with the sand, which pose a potential risk to golfers if they're struck. They can also land on the putting surfaces where they can cause damage to mowing equipment.

Once we have installed good drainage systems, they can become blocked by silts, so it's important to make sure we have the correct gradation of particles from the course drainage aggregates to the fines of our sands. Drainage aggregate can also become a pollutant if sand levels are not maintained and the gravel comes up into the sand.

The edges of the bunker are also an interface between the soil, turf and sand. Stones can encroach from the edges of the bunker, but probably more troublesome is the soil that can be washed in, changing the drainage characteristics of the sand.

Placing a small revetment of about three turves around the edge of the bunker gives good definition and acts as a good barrier to prevent this occurring.

Contamination from areas outside of the bunker, such as grass and leaves, can be easily dealt with by simply blowing bunkers out prior to raking or after maintenance practises.

The key to achieving good consistent bunkers is to create similar conditions throughout the golf course in different environments, and an effective sub base and drainage is a good start.

In order to minimise contamination to the sand from the base or the sand and silts to the drainage we need to create a bridge or blinding layer between the sand and the drainage. This can be done in a number of ways.

A layer of coarse sand or grit can be put over the entire base of the bunker creating a barrier between troublesome sub soils and the sand. The important thing to remember with this is that the layer has to be thick enough to stop movement upwards but also of the right depth and particle size as to not restrict drainage. Sand levels must be monitored. A distinct difference in colour between the sand and coarse sand/grit will help identify when levels are in need of attention.

Liners are also a good option between the drainage layer and the sand. There are many options available, but ideally look for a lining system with the following qualities.

It should be permeable so water can travel through to drainage. It should also be able to withstand impact from golf clubs and not rip or chip, as in the real world, sand levels fluctuate and at some point a golf club will come into connection with the liner. It should also be able to expand and contract with varying soil conditions in summer and winter and should ideally improve sand holding capacities on bunker faces.

Choosing the correct bunker sand can be a minefield, but good advice is available from your agronomist and reputable suppliers.

When it comes to bunker maintenance, different raking techniques can be used to help you achieve your goals. Softer sands may need to be flat raked to minimise plugging or try using rakes with shorter teeth. Flat raking around the outside of the bunker improves the chances of the ball coming to rest in the bunker base and not on the face. Varying raking directions helps with the even distribution of sand. Brushing of bunker faces with a stiff bristle broom can also produce an interesting appearance.

The key to achieving good consistent bunkers is to create similar conditions throughout the golf course in different environments, and an effective sub base and drainage is a good start

Devise a maintenance plan specifically for the bunkers on your course with the aim of achieving greater levels of play and giving them the attention they need. Greenside bunkers may be raked every day along with crucial drive bunkers. Bunkers situated further out of play may get foot printed every third day.

Every golf course we work on is different.

The key to success is creating consistency throughout your site and maintaining it by minimising contamination and finding a simple solution to bunker maintenance. Good luck with your bunker endeavours this winter!

Early southern summer scorcher left a dry taste for turf

Dr Terry Mabbett looks at the knock-on problems that can be created by stressful weather conditions

Southern England's middle summer months left a distinctly dry taste for turf in 2010. A succession of scorching hot and rainless days through June and July left turf dry and drought stricken with a repeat of 1976, one of the hottest and driest summers on record, looking a real possibility.

All grades of un-watered turf across the region became brown and lifeless as turf grasses shrivelled, although many broadleaf turf weeds were still growing and outwardly unaffected. They continued to flower, fruit and seed, staking out a strong and dominant position for the return of normal growth conditions.

In the end the notoriously fickle British weather saved the day following an extremely wet August with the lowest recorded mean temperature for 17 years. Equally remarkable was the speed of turf grass recovery which by September looked lush and green as though nothing had happened, except for the weeds. At the height of the drought in mid-July turf weeds such as white clover (Trifolium repens) and yarrow (Achillea millefolium), recognised as drought tolerant, and others like self-heal (Prunella vulgaris) and creeping cinqefoil (Potentilla repens) which are not, were seemingly unaffected by the drought, flowering profusely with seeds ripening quickly in the hot summer sun.

UK turf generally benefits from a benign climate and environment and is relatively untroubled by biological agents (e.g. weeds) compared with turf grown in other parts of the temperate world. But for the first time since its widespread development and adoption as a playing and leisure surface, UK turf could face a double-whammy of man-made and contrived threats with a combined and related force that could change the face of golf courses.

First is the generally accepted threat of climate change and global warming which promises hotter and drier summers on a regular basis. Second is the EU blitz on turf pesticides right across the sports turf and amenity sectors. Disappearing fast are products using a long-established and traditionally-used range of sophisticated and high efficacious herbicide actives. Greenkeepers have relied on herbicides to keep their most professional playing surfaces (greens and tees) essentially weed free and to manage weeds as appropriate across the rest of the golf course. At first sight the two seem totally unrelated but nothing could be further from the truth.

But for the first time since its widespread development and adoption as a playing and leisure surface, UK turf could face a double-whammy of man-made and contrived threats

Broad leaved plants are generally better able [than turf grasses] to withstand drought conditions and those which grow in turf always manage a head start over grasses - if they didn't they wouldn't be successful turf weeds. Some might argue that disappearance of established herbicides for managed turf is a 'red herring' [in relation

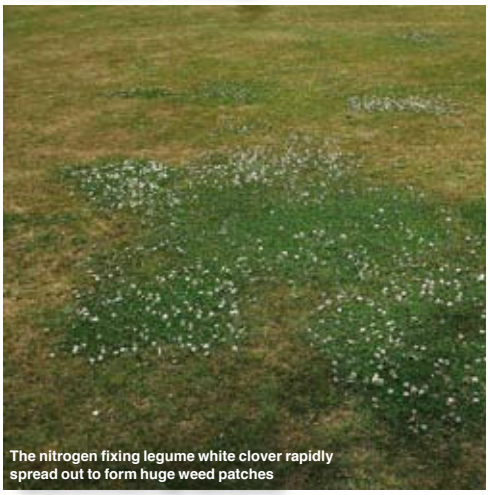
MAIN PIC ABOVE: Yarrow, a dedicated drought tolerant turf weed had a field day


Yarrow, a dedicated drought tolerant turf weed had a field day


Creeping cinquefoil not noted for drought tolerance persisted while all the grass around gave up the ghost


Self-heal is more usually associated with damp turf but that also did well out of the drought


Bird's foot trefoil is recognised as highly drought tolerant due to its stout tap root


The nitrogen fixing legume white clover rapidly spread out to form huge weed patches


By September dandelions were much more in evidence than usual and flowering


Even opportunistic turf weeds like bristly ox-tongue did well, surviving the drought courtesy a deep and strong tap root


By September the normally diminutive and difficult to see parsley piert was spreading across tees like lush green parsley as its common name suggests

to increasingly severe summer drought conditions] because selective herbicides are never applied during extended periods of dry weather when the grass is not actively growing. But on the other side of the global warming 'coin' are predicted wetter winters with the classical December-February UK winter period squeezed at both ends by extended autumns and earlier springs.

These are the seasons when weed pressure, originating during hot dry summers, will be felt. You only had to look at the lush green turf in September 2010 to see how the situation had changed in a matter of weeks. Turf grass growth had recovered but weeds like white clover and yarrow didn't need to recover and simply took over with huge patches across even professional sports turf. And if herbicides are no longer available for prompt application in September when the rain resumes there will be no way of shifting such fast moving and well established weed growth that will persist through to spring.

The industry is preoccupied with new grass species and varieties to withstand hotter and drier summer conditions but largely ignores the inherent capacity of many native and naturalised broad leaf turf weeds to effectively withstand severe drought conditions. We are so conditioned to our inherently wet climate that we never dream to imagine that native and naturalised broad leaf weeds are drought tolerant.

What's more those plant characteristics like finely-divided leaves with thick cuticles and underground vegetative organs, which confer general drought tolerance, are often the very same characteristics that make drought tolerant species difficult to kill with herbicides. In a nutshell plant leaf shape and surface structure that makes it harder for water to escape from the plant make it equally hard for herbicide to get in.

Yarrow

Yarrow is the classic drought tolerant weed of UK turf with finely-divided leaves protected by a thick cuticle and wax bloom and providing the ideal bulwark against excessive loss of water by transpiration during hot dry conditions. These are the self-same plant characteristics that make yarrow one of the most herbicide tolerant of all broad leaf weeds in UK turf. Yarrow thrives in undernourished low fertility soils and swards and will continue to