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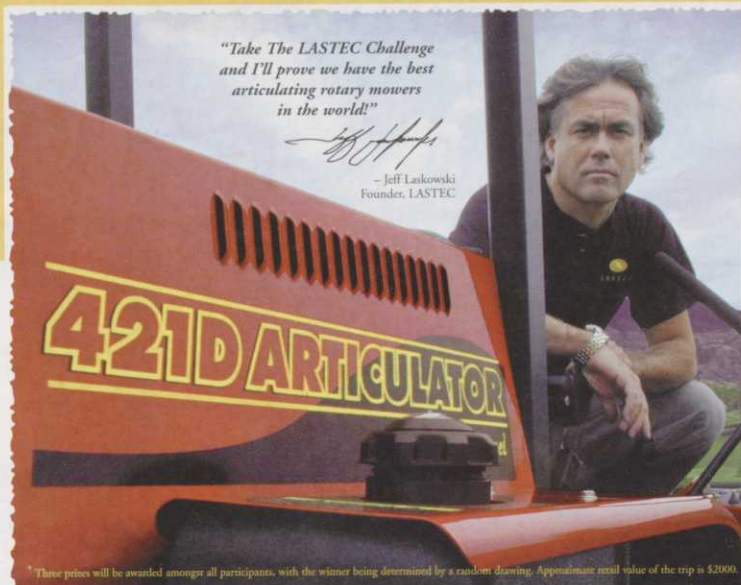
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Roland Taylor cuts up rough as he looks at the best ways of maintaining those areas off the straight and narrow

# Cutting up rough

Looking through a magazine dated 1927 recently I found a series of essays written by greenkeepers as part of a competition. They were asked several questions about their work and one in particular wanted to know what equipment they used. Hand machines were used by all for their greens and tees. The fairways were cut with a petrol-powered mower but no mention was made of the rough, in all cases. Gangmowers were available around this time, but the rotary mower was yet to be invented so one has to assume on some courses once the ball went off the fairway players were in deep trouble.

Being man-made a course has to harmonise into the natural landscape and this can be parkland, heathland, moorland or seashore which if left to its own devices will start to encroach on the playing surfaces. While the areas immediately adjacent to the fairways, the rough are under a tight management programme beyond these other areas needs have to be taken into account as far as control is concerned.

The rough is a significant part of the game, the wrong kind can have distinct disadvantages, especially on courses where player numbers are of major importance. The main reason being wayward shots that take a long time to find slow up the game considerably. This can be the controlling factor when it comes to deciding the type of rough produced.

The areas adjacent to the fairways require a similar turf management

schedule with only the major difference being in the height of grass left after mowing. There is an abundance of equipment now on the market to deal with these areas and those outside the main playing surfaces.

## Cylinder mowers

These were and still are the traditional method of cutting and now come in various configurations. Trailed gangmowers are still used on many courses and little has changed in their basic design. The development of hydraulic systems and drives lead to the introduction of the new units that, whilst still being towed, have the advantage of constant power to the cutting units and the ability to lift the

mowing units for working around obstacles or transportation. A number of these types of machines are available.

The next progression was the launch of self-propelled mowers with either three or five cutting units, probably the most common type of equipment used today.

On all cylinder units there is a limit to the length of grass they can handle. A major governing factor is the number of blades on the reels - the less there are the longer the grass that can be tackled. The down side of this is that the quality of finish is affected as the cuts per metre drops. The introduction of the rotary principle offers an alternative mowing solution.



# Cutting up rough



## Rotary mowers

The first trailed rotary mowers appeared on the scene in the early fifties. These belt driven units were powered from the tractors PTO and had a mowing width of up to 14ft and were originally developed for orchards.

Greenkeepers soon recognised the benefits this type of machine offered when it came to cutting their rough - the length of grass and other vegetation was no problem.

Today, there are a number of trailed machines available including ones made up of small independent cutting heads that freely float and are said to follow the ground contours closely. Recent years have seen the introduction of high output wide self-propelled ride rotaries. These are made up of independent hydraulically driven cutting heads. Like their cylinder



counterparts these machines have all the benefits of ease of operation

Other developments of the rotary principle have been recycling systems. These chop the cut material into fine pieces and are said to deposit it back deep into the sward.

A point worth remembering is that gang mowers have been doing this since they were first introduced.

Whilst collecting grass is not generally a viable proposition on the areas under review there are a number of high output ride-on rotaries with collection and high lift emptying now on the market.

They also have the advantage that they can be used for leaf collection and some have attachments such as wide scarifiers and rotary brushes for hard surfaces like car parks.

## Flail

The flail principle will deal with a wide range of vegetation lengths and the trailed versions usually have a collection facility. They can also be used for scarifying and leaf collection.

Further back from the fairways growth can often be thicker and whilst it may not be cut very often there are times when this is necessary. Both rotary and flail machines will deal with this situation. For steep banks, ditches or river sides there are the tractor mounted long arm flail heads which can also be used for hedges. For confined areas smaller pedestrian rotaries and flails are readily available.

Brushcutters are ideal for clearing scrub, bracken and heather. These are now available as handheld units or ride-ons. The former should not be confused with the grass trimmers.

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They are more powerful and were originally designed for harvesting small trees. Nylon line cutting heads are available in addition to saw blades. Some manufacturers offer back-pack models for use in difficult areas.

The ride-on brushcutter is designed to deal with all types of vegetation including saplings and is compact enough to get into tight spots. They are the answer for clearing woodland paths or cutting fire breaks. On courses that have small tree plantations this type of machine is suitable for grass and weed control.

Flicking through recent issues of this magazine it is evident that there is now considerable emphasis being placed on creating natural havens on courses where flora and fauna can thrive. These areas require specialised

management and the occasional use of machinery to ensure dominant species do not completely take over. When considering equipment for the rough it is a good idea to also take into account these areas, as often there is a machine available to cope with both types of conditions.

Talking to golfers it is clear that they are out to enjoy themselves and the average players are going to finish often, or sometimes, in the rough. While it is designed to keep them on the straight and narrow if it is too high or thick then they are going to be unhappy and will be lodging complaints or not be coming back. A point worth taking into account when deciding how long to leave it and how often to cut it.



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**Golf courses are not just areas for playing the game, but also act as protectors of the environment and are important in nature conservation. Is this statement true or false? The answer depends on who you ask, but here Alan Gange and Della Lindsay, of Royal Holloway, University of London present some scientific evidence to support it**

# The & birds bees



Golf courses are perceived by some as being bad for the environment. Vociferous anti-golf lobbies often claim that large amounts of water, fertiliser and pesticides are used and that little thought is given to the management of the non-playing areas of the course. We suspect that virtually every greenkeeper in the country knows that these statements are not true, but what is the opinion of the general public?

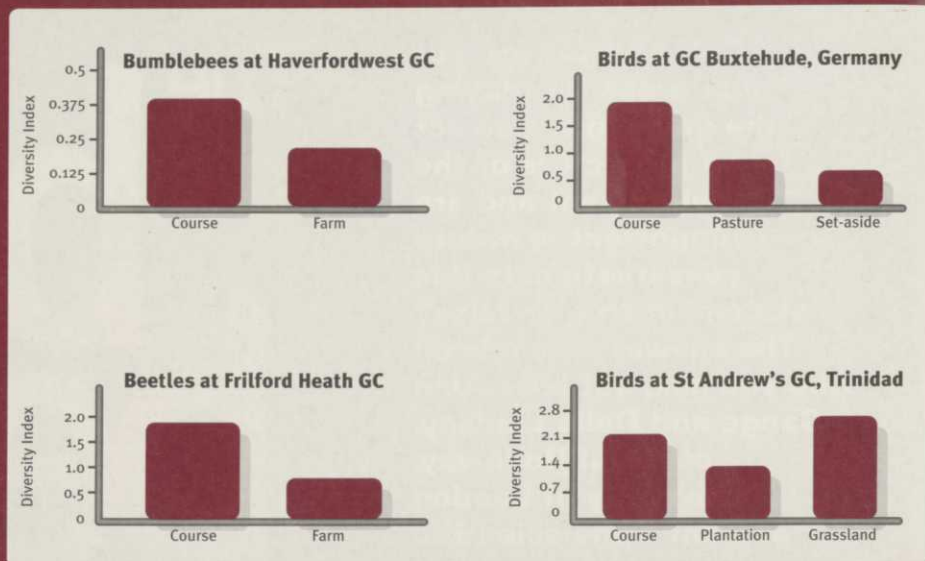
When one starts delving into the literature on this subject, it is immediately apparent that there is very little published information on the broader aspects of golf course conservation and even less on the public understanding of it. We therefore decided to perform a survey of local people, to ask them their opinions of

golf courses. We spoke to several hundred people in Surrey and south east London and among a series of questions, asked them if they thought that golf courses are good or bad for the environment and whether they play golf.

The results were very interesting, but worrying at the same time. Among golfers, 77% thought golf courses were environmentally friendly, but among non-golfers, this figure dropped to an alarming 43%. This result is perhaps not surprising to readers of Greenkeeper International, but shows that there is a lack of knowledge among the general public. The majority of golfers know that courses are good for conservation purposes, but of those people who have never been on a course, the

majority think they are bad for the environment.

We therefore believe that there is a distinct need for information on the role that golf courses play in the landscape and so recently, a number of our students have performed habitat surveys of courses. Looking at the literature, we decided that in many previous studies, the wrong ecological questions had been asked. Usually, workers have compared the diversity of species on a course with a nearby area of natural habitat. However, we believe that a more ecologically realistic question to ask is - How does the species diversity of a course compare with the nearest piece of habitat, which the course would be, if it was not used for golf? In many cases, the nearest piece of



Captions for slides

- [slide label: Haverfordwest GC] Haverfordwest GC is situated amongst farmland and provides a varied selection of habitats, particularly for bumblebees.
- [slide label: pitfall@Berks] Pitfall traps are a simple way of monitoring populations of ground-dwelling insects
- [slide label: carabid adult] Carabid beetles may look fearsome, but they are some of Nature's most useful predators
- [GC, Trinidad] Set amongst natural habitats, St Andrews GC, Trinidad is a haven for bird life
- [slide label: Egrets, Trinidad] Avian spectators on St. Andrews GC.

habitat which the golf course would have been is not undisturbed habitat, but farmland or semi-natural habitats such as set-aside land.

Faunal surveys of golf courses are ideal for final year student research projects and with suitable training, students can walk golf courses on a defined route, identifying and counting target groups as they go. Such survey techniques are well established in Ecology, and the data produced can be subjected to a variety of statistical techniques. Certain groups of insects and birds are easy to identify in the field and for larger insects, such as bumblebees and beetles, the specimens can be captured, marked with a small spot of non-toxic paint and released. Counts of these insects can therefore be very reliable, as we know if the same insect has been caught before.

At Royal Holloway, a number of these surveys have been performed in the last couple of years and in this article we present the results from four case studies, from different parts of the world. In all cases, we record

the number of species and the numbers of individuals of each species. These two quantities are then used in the calculation of an index of Diversity. Diversity is an often misused term in Ecology and is frequently (wrongly) equated with the number of species in an area. In fact, diversity is a composite term, which takes into account the number of species and the spread of individuals across species. A habitat that has a similar number of each species is considered to be more diverse than one in which one or a few species dominate, even if the total number of species in each habitat is the same.

**Case study 1:** Haverfordwest Golf Club, South Wales

Haverfordwest GC is nearly 100 years old and is surrounded by pasture grassland, supporting sheep, with some beef and dairy cattle. Therefore, if the golf course did not exist the land would most probably be used for livestock farming. In this study, we compared the bumblebee fauna of the course and an adjacent farm over one summer.

The diversity of bumblebees on the golf course was significantly higher than that of the farmland (Fig. 1). Two reasons accounted for this fact—more bumblebee species were found inhabiting the golf course and the number of individuals of these species was also higher. Table 1 shows the mean number of individuals captured per day over the summer for the five commonest species. Most species were significantly commoner on the course and only one species was more abundant on the farm.

Bumblebee species	Golf course	Farmland
<i>Bombus lapidarius</i>	93	17
<i>B. lucorum</i>	77	38
<i>B. pascuorum</i>	67	40
<i>B. terrestris</i>	56	54
<i>B. pratorum</i>	44	17
<i>B. hortorum</i>	21	34

Table 1. Average number of bumblebees caught (and released!) per day

These data are very interesting because in recent years there has been much concern over the decline of bumblebee populations in the UK. These insects are extremely important pollinators of a number of our crops and agricultural intensification has often been cited as a reason for their loss. It appears that golf courses may provide valuable habitats for these insects, because unlike farmland, the habitat structure is more varied, providing nest sites and abundant flowers for food. The former reason is certainly the case for *B. lapidarius*, which prefers to nest in dry, stony areas, with little vegetation. Such microhabitats were rare on the farm, but common in banks on the course. Flowers for foraging bees were available all summer in the natural habitats on the course, but the only flowers in abundance on the farm were thistles and clovers, neither of which flower all summer, meaning that there were gaps in the availability of food.

**Case study 2:** Frilford Heath GC, Oxfordshire

Frilford Heath possesses three 18 hole courses and we compared the most recent course, opened in 1994, with a nearby arable farm. Our target insects this time were ground beetles, known scientifically as carabids. These beetles are predatory and there has been much recent research aimed at enhancing their numbers on farmland, where they can act as important control agents of pests, such as slugs and cereal aphids. Carabids are easy to catch in pitfall traps, where a small plastic cup is inserted into the ground so that its rim is flush with the soil level. The beetles are mainly active at night and an early morning survey reveals those beetles which have fallen into the traps.

As with the bumblebees, we found that carabid diversity was much higher on the course,







being over twice that of the farmland (Fig. 1). Carabids were also more abundant on the course; we caught an average of 5.6 beetles per trap per week on the course, compared with only 2.9 per trap per week on the farm.

Golf courses could therefore act as potential reservoirs of these predators in an agricultural landscape. On farms, special areas are often created, known as 'beetle banks' in which carabids can breed, before dispersing into a crop. From a beetle's point of view, the course could represent the Bank of England, but we need more research to determine whether these insects can disperse from courses on to neighbouring farms.

#### Case study 3:

Golf Club Buxtehude, Germany

Golf Club Buxtehude is situated in Lower Saxony, Germany and is about 15 years old. Nearby are two habitats which the course might have been, one is pasture grassland and the other is a large area of 'set-aside' land, where farming has ceased and natural habitat regeneration is occurring. In theory, the latter habitat should encourage species diversity, as the use of pesticides and fertilizers is banned there.

Birds were our target group here and

the diversity was recorded over a summer season. As can be seen from Fig. 1, the golf course had a considerably higher diversity than the pasture or set-aside. It may seem surprising that the set-aside, which is designed to encourage diversity, actually had the lowest value. The likely reason is that a greater variety of habitats existed on the golf course, because shrubs and trees had yet to establish on the set-aside area. A total of 19 bird species were recorded using the golf course (i.e. either feeding or breeding there), compared with 17 in the pasture and 14 in the set-aside area.

Agricultural intensification has also been cited as the main reason for the decline in populations of many farmland birds. However, by construction of the appropriate habitats on courses, we believe that many of these declines could be reversed in the future.

#### Case study 4:

St Andrew's GC, Trinidad, West Indies

Our most exotic location was St Andrew's GC, a mature course situated on the island of Trinidad. The course forms part of a large estate and is surrounded by cocoa plantations and areas of natural grassland. At the time of our study, the grassland had been earmarked for a housing devel-

opment. We recorded bird diversity in the three habitat areas during the latter part of the wet season (June-September).

This was the only example where the golf course habitat did not exhibit the highest diversity (Fig. 1), being slightly lower than the grassland. However, diversity was higher than the plantation habitat and shows that if the grassland must be lost, it would be better to convert this land into a golf development, rather than plantation, or indeed, bricks and mortar. Eighteen bird species were found using the course, compared with 19 in the grassland and 16 in the plantation.

We found a great similarity in the identity of the bird species using the golf course and the grassland habitat, but those in the plantation were quite different. The bird faunas of course and grassland were dominated by insectivorous species, while that of the plantation was dominated by frugivorous species. These data suggest to us that golf courses are able to maintain the species diversity that is normally associated with natural habitats and this could be very important in maintaining the fragile faunas on islands such as Trinidad.

#### Conclusions

We realise that we may be preaching to the converted in this article, but our aim here has been to stimulate interest in the subject. Many golf club members are excellent natural historians and perhaps in the future they could combine their rounds with some bird, butterfly or bee surveys. If any clubs are interested in such surveys, please contact us. Perhaps such surveys could be promoted locally, thus bringing them to the attention of non-players.

Undoubtedly, it is the non-golfing public that we need get this information to as well. We are currently in the minority, as neither of us play golf, but both believe that courses are good for the environment. It would be nice in future to be in the majority!

Alan Gange is Senior Lecturer in Environmental Biology at Royal Holloway, University of London. Della Lindsay is studying the conservation of heathland on golf courses for a doctorate degree and is funded by the Royal and Ancient Golf Club of St Andrews.

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**Fiona McIntyre, of the Scottish Golf Course Wildlife Group, gives some advice on making the most of the water on your course**

# The name's pond...



This winter's heavy rainfall has produced many new and often unwelcome ponds, wetlands and bums on Scotland's golf courses. However water can be an asset to your course, in the right place.

Ponds and wetlands for example can provide golfing features, reservoirs for the irrigation system, a catchment to alleviate drainage problems, or simply an attractive addition to the course. In reality many ponds on golf courses will serve more than one purpose. Whatever their purpose on the course it is likely that ponds will support wildlife, and with careful management could be further enhanced for wildlife and golfer alike.

Throughout Scotland many ponds are being lost, and many more suffer damage through pollution and inappropriate management. This means that golf course ponds can be important wildlife resources within the wider countryside. Ponds provide breeding areas for frogs, toads, newts

and dragonflies. If they are large enough ducks and moorhens may breed and other fauna such as deer, foxes and birds will welcome a source of drinking water.

So what makes a good pond? There are a number of features that are important such as irregularly shaped edges, shallow margins well stocked with native plants and a variety of depths. A good pond should look like it has always been there, and that the golf course has been built around it. Ponds that do not already have these features often look unnatural and fail to mature. There are many examples of 10-15 year old ponds that still look as though they were built last year, and will always look like this due to poor design. However, such ponds can be enhanced through creation of shallow margins and planting, which can be done by excavation or partial infilling.

The position of a new pond on a golf course needs to be carefully select-