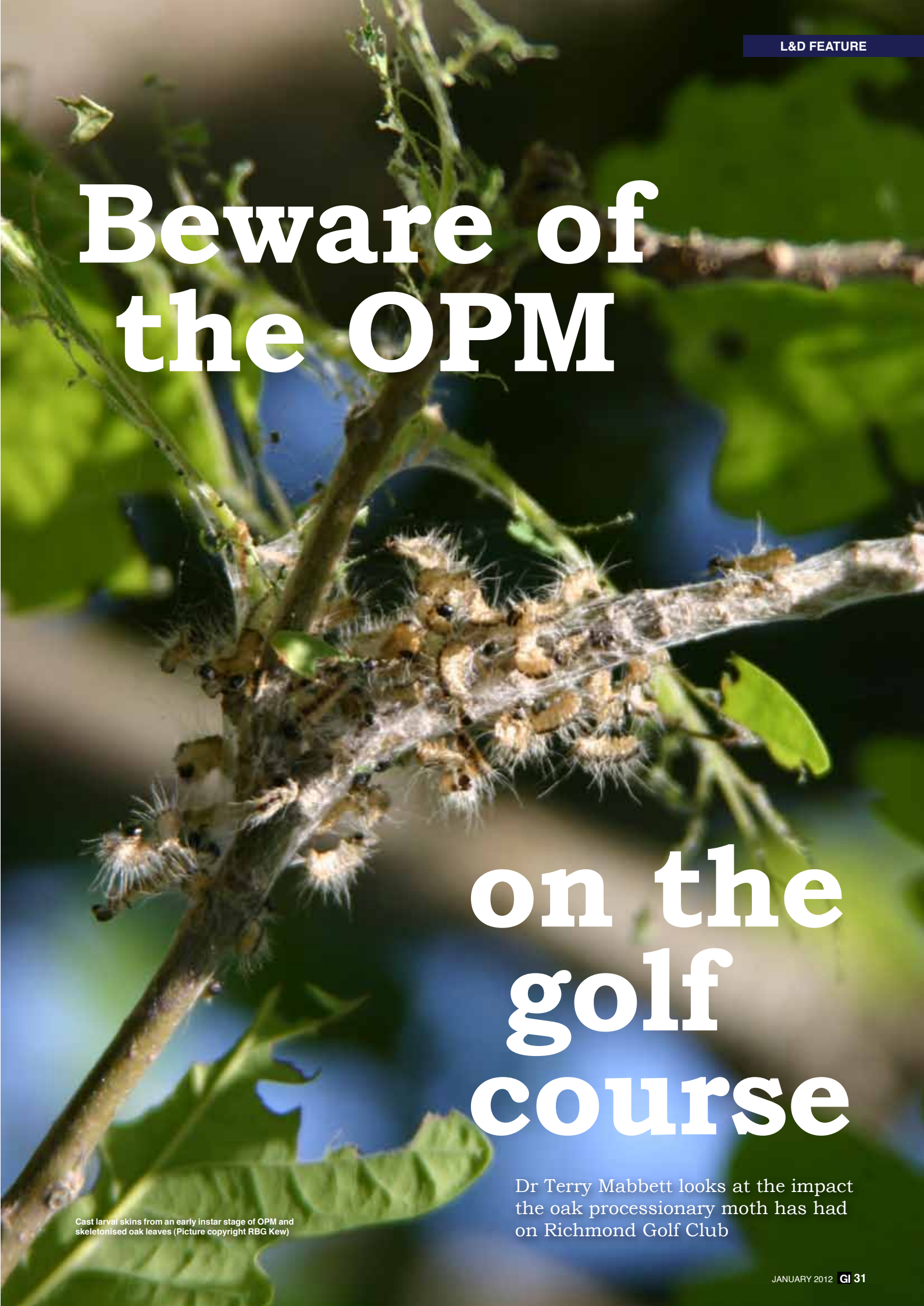
# Beware of the OPM on the golf course



Dr Terry Mabbett looks at the impact the oak processionary moth has had on Richmond Golf Club

Cast larval skins from an early instar stage of OPM and skeletonised oak leaves (Picture copyright RBG Kew)

**2006 saw Britain enter a new dimension in insect pest infestation with the discovery of oak processionary moth (Thaumetopoea processionea) on newly planted imported oak trees in the London Boroughs of Richmond and Ealing.**

For the first time the United Kingdom faced a dual-dimension insect pest (amenity and public health) affecting people as well as trees and with the capacity to kill either, as well as domestic pets and farm animals.

Oak processionary moth (OPM) had been spreading northwards in Europe for some years and was already endemic in Germany and the Benelux Countries.

The insect sneaked into England as plaques of eggs on semi-mature cypress (fastigiate) oak trees (Quercus robur f. fastigiata) imported from a nursery in southern Holland and subsequently planted on landscape projects in Richmond and Ealing.

At first the Forestry Commission (FC) claimed it could eradicate the pest but soon realised it 'had bitten off more than it could chew'. By 2011 OPM was well established in five contiguous London Boroughs (Richmond, Ealing, Hammersmith and Fulham, Hounslow and Brent) in what became known as the 'core outbreak zone'.

In March 2011 FC stopped serving statutory enforcement notices for OPM nest removal and pest control in this 'core zone', leaving local authorities, private landowners and householders to take the initiative and to continue to pay for any control. FC said it would now serve notices within a 'buffer zone' of 10km radius around the 'core zone'. This 'buffer zone' was subsequently breached by OPM during the spring and summer of 2011 including eastwards onto Wimbledon Common.

Additional outbreaks almost certainly originating from new introductions on oak trees imported from the Netherlands subsequently occurred during 2010. At least one post-dated the necessity for oak trees imported into the UK from the Netherlands and other EU countries to be accompanied by an 'EU Plant Passport'. This became effective on March 31 2008. The outbreaks were found in North Surrey, Pangbourne in Berkshire and Sheffield in late summer 2010.

OPM is a poisonous pest

OPM attacks oaks of all ages and stages, and appears to favour trees growing in an open well-lit situation. In this context OPM could not have chosen a better place to invade than the London Borough of Richmond which is exceptionally well blessed with large open spaces and places. Kew Gardens, Richmond Park (Royal Parks), land belonging to Richmond Borough Council and several high-prestige internationally acclaimed golf courses are all affected and now operating programmes of pest containment, control and eradication.

They employ specialist arboriculture companies with the equipment and expertise to deal with this now well-established pest carrying serious implications for public health and safety. Each third instar (growth stage) larva carries over 60,000 stinging hairs 'barbed' with an urticating (irritating) and allergic reaction histamine-releasing protein with potential lethal risk to people, pets and livestock.

One of the golf courses affected is The Richmond Golf Club at Sudbrook Park which is using Bartlett Tree Experts, headquartered at Beaconsfield in Buckinghamshire. Bartlett Tree Experts has countrywide coverage through a series of regional offices and depots from where it carries out pest management programmes. I spent a day in May 2011 with a highly experienced two-man specialist spray application team (Adam Clarke and Chris Gill) from Bartlett Tree Experts on The Richmond golf course to learn first-hand how they are managing this dynamic pest problem. I later spoke at length with Course Manager Les Howkins MG to get his views on OPM, its control and the implications for golf courses in the UK.

## A spray day in May

Adam Clarke and Chris Gill, two highly skilled arborists, had started to spray and were well on their way to treating all 700+ oak trees on the course, including saplings and newly planted trees.

"Most are native English oak (Quercus robur) with significant numbers of Turkey oak (Quercus cerris) and a few red oaks (Quercus rubra), all of which will be sprayed," said Chris Gill.

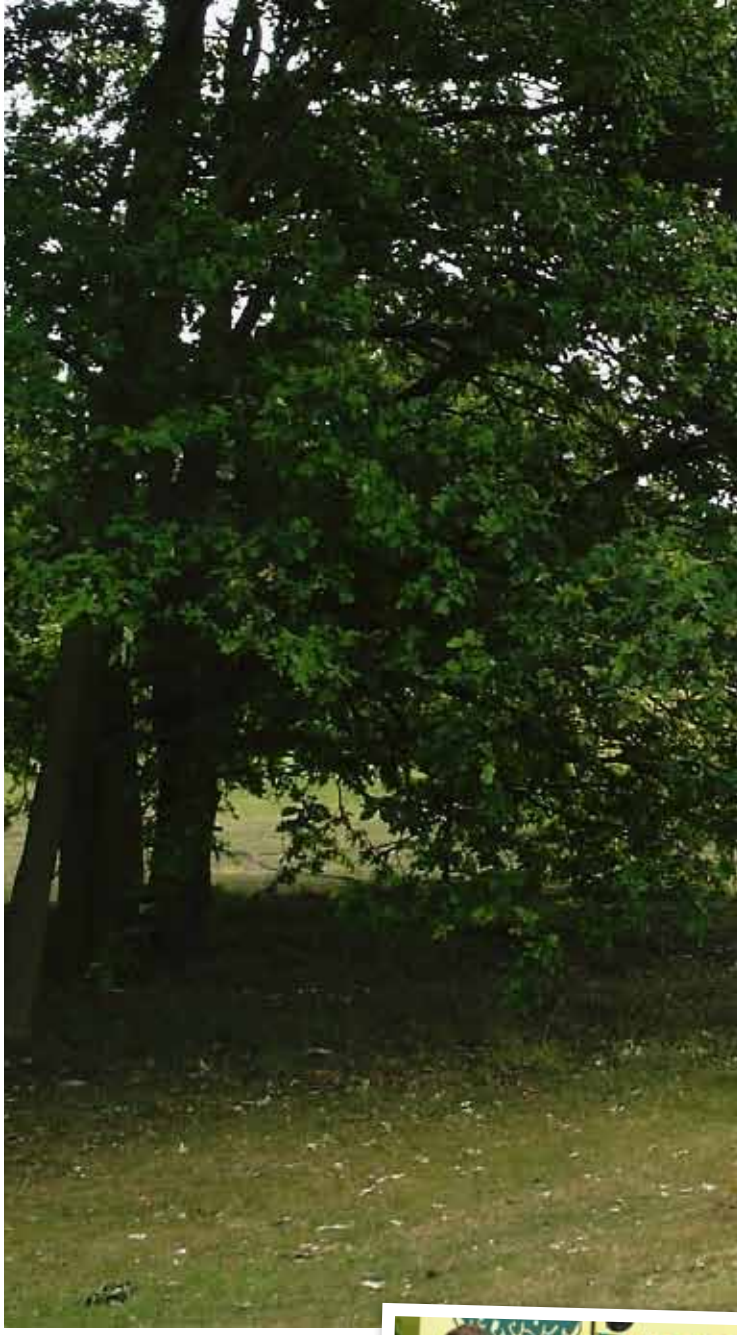
The Richmond has a management plan comprising preventative spray application to all oak trees that were infested in the previous year with accompanying treatment of all adjacent susceptible oaks. However, it faces constant threats from adjacent infested sites not able to spray insecticide due to SSSI (Site of Special Scientific Interest) status or not willing to implement adequate control, or indeed any control, for financial or other reasons.

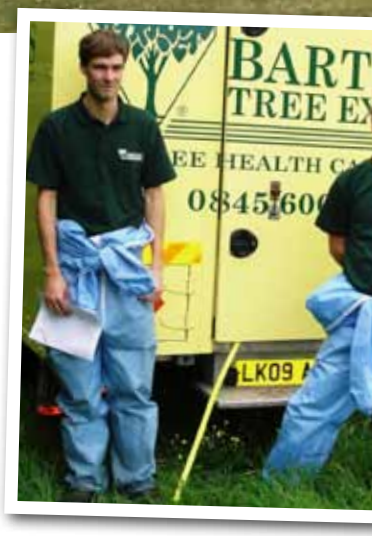
This presents the risk of re-infestation on a yearly basis from sites doing nothing or having inadequate programs in place. Golf courses in particular are in no position to 'mess around' with OPM (for safety reasons). The Richmond has opted for deltamethrin, a highly potent synthetic pyrethroid insecticide to provide a quick, efficient and cost effective kill of OPM larvae.

"There are no water courses on this site so the toxicity of deltamethrin to fish and other aquatic life does not arise," said Chris.

## No risk

The Richmond is clearly not prepared to take any chances from using less quick and complete-kill products like the insect growth regulator diflubenzuron or the bio-insecticide Bacillus thuringiensis (BT). Bottom line for The Richmond

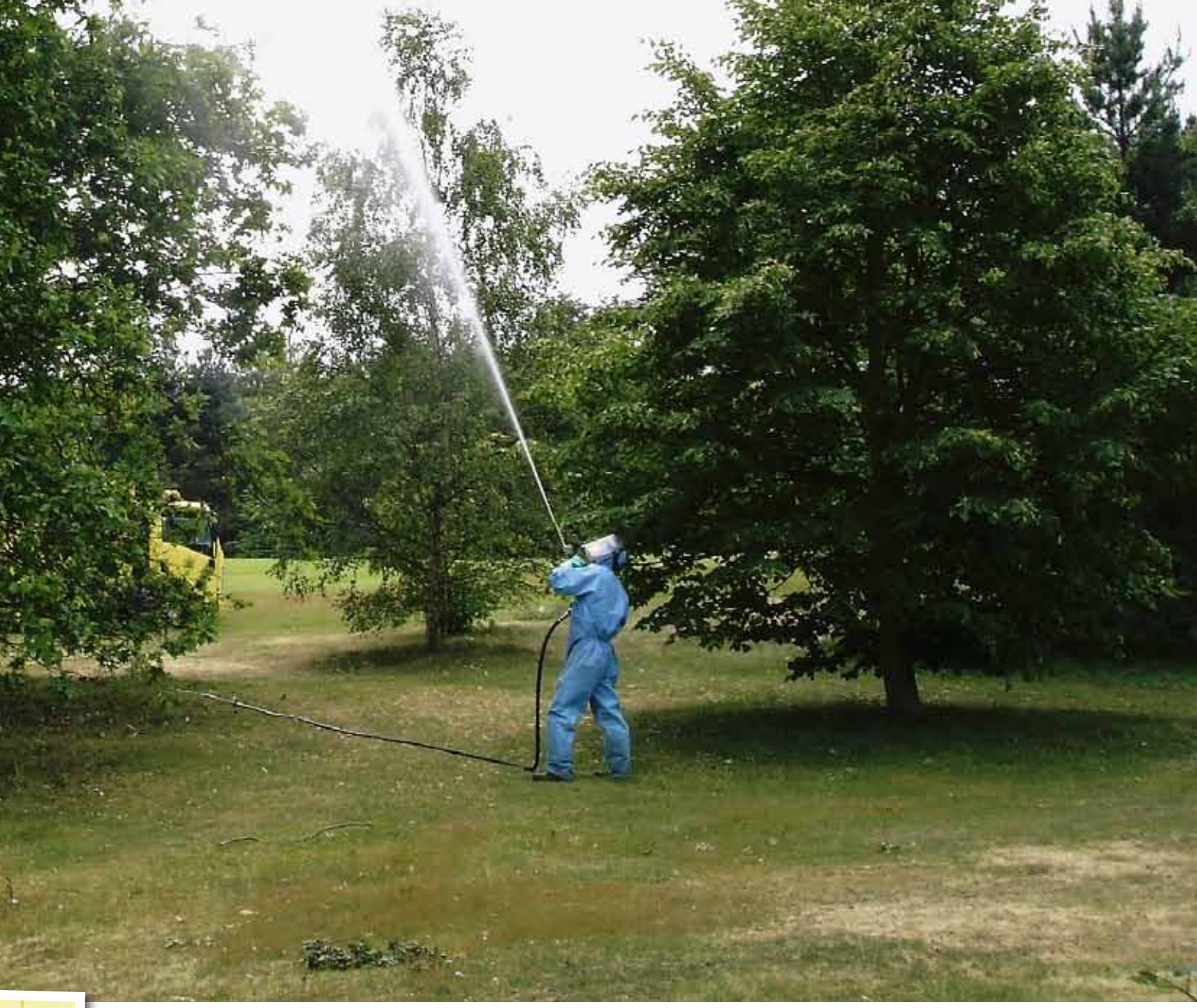





**MAIN ABOVE: With a height reach of 30m, covering the tops of the tallest English oak trees is no problem**

**INSET ABOVE: Successful end to another 'Spray Day'. Adam Clarke (left) and Chris Gill (right)**

**Photos courtesy Dr Terry Mabbett**



**"We take all precautions when spraying. Bee hives are shut down and extra care is taken to ensure no spray droplet drift occurs across the course and onto adjacent land and properties"**
Adam Clarke

is protecting the health and safety of members and players from urticating (irritating) hairs on OPM larvae from the L3 (third instar) stage onwards.

"We take all precautions when spraying. Bee hives are shut down and extra care is taken to ensure no spray droplet drift occurs across the course and onto adjacent land and properties," said Adam.

The situation and conditions prevailing on May 17 last year illustrated the problems posed and accompanying care which has to be taken during OPM spraying. Adam and Chris had started at 6am when the wind was just right to avoid any drift onto adjacent sites. The Richmond and its adjacent sites had active OPM infestation among the hundreds of oak trees scattered across the respective areas.

The initial infestation at The Richmond was discovered in June/July 2010 during a routine FC inspection and the club was duly served with a 'statutory notice' for OPM control. But this was after the time period for effective control by spraying had passed leaving a programme of nest removal as the only option for that year.

Nest removal is potentially dangerous for operators who run the risk of sustaining allergic reactions from contact with the uticating hairs and is proving ineffective because some nests are invariably missed. It is also very labour-intensive and therefore costly and in the case of The Richmond proved to more than twice as expensive as the following year's (2011) spray programme.

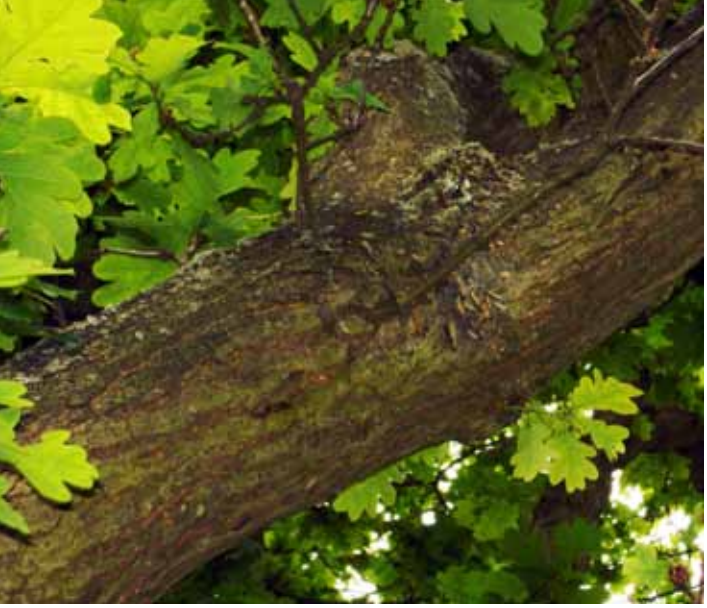
Ideal spray timing is when OPM larvae are in L1 to L3 prior to the development of urticating hairs and when they are most susceptible to insecticides. When larvae reach L4 they are covered in toxic irritating hairs and the fall out of dead larvae from trees after spraying creates whole new management and safety problems.

Adam and Chris were on the lookout for clusters of early instar larvae.

"It is too early to see any results of feeding activity or damage although we would have started to find skeletonised leaves very soon," said Adam.

Maintaining OPM populations as low as possible is the only realistic policy as far as this golf course is concerned.

"Unfortunately they can only approach and achieve it on an annual basis despite the near 100% control we will have achieved by spraying with deltamethrin. Re-infestation is likely to occur

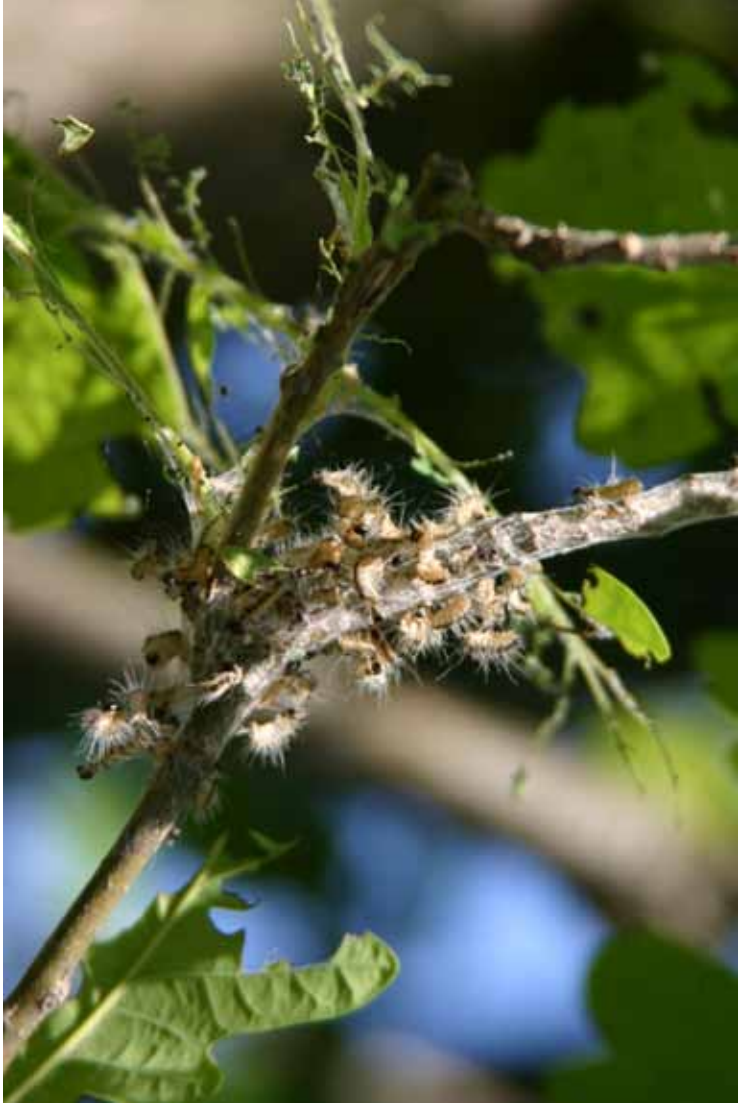


**ABOVE: The sprayed larvae were clearly dead, dislodged and hanging upside down from their webbing** (Picture courtesy Dr Terry Mabbett)

**BELOW:OPM pupae and nest; RIGHT: Plaques of OPM eggs laid on a small branch of an English oak tree** (Courtesy Bartlett Tree Experts)

**RIGHT: Cast larval skins from an early instar stage of OPM and skeletonised oak leaves** (Picture copyright RBG Kew)

**BELOW:** (Courtesy Bartlett Tree Experts)



annually so long term eradication is not going to happen."

Tony Bartram, Assistant at The Richmond and a qualified tree surgeon, monitored the course throughout summer 2011 and did not see any OPM nests following the spraying.

"However, residual OPM infestations from surrounding sites will migrate straight back onto the golf course every year which means the golf course management will be forced to review their control program and decide weather to spray every year from now on," said Chris.

## The spray operation

The Richmond is a busy golf course and the 700+ oak trees are spread across the 18-hole course, some singularly, others in groups with many already at full grown size. You could gauge just how tricky it was for these guys to spray effectively and safely as Adam 'tooled up' to treat a group of 18 English oak trees. There was a fairway with players on both sides of the grove but Adam wasted no time in kiting up in full safety gear and protective clothing. This was the bigger of the two spray rigs used by Bartlett Tree Experts at this location and with a maximum spray reach of 30m would easily cover the very tops of these trees.

I stood well back and upwind as the powerful spray stream shot into the canopy. It took Adam just three minutes to deliver the 300 litres of spray required to adequately cover these trees.

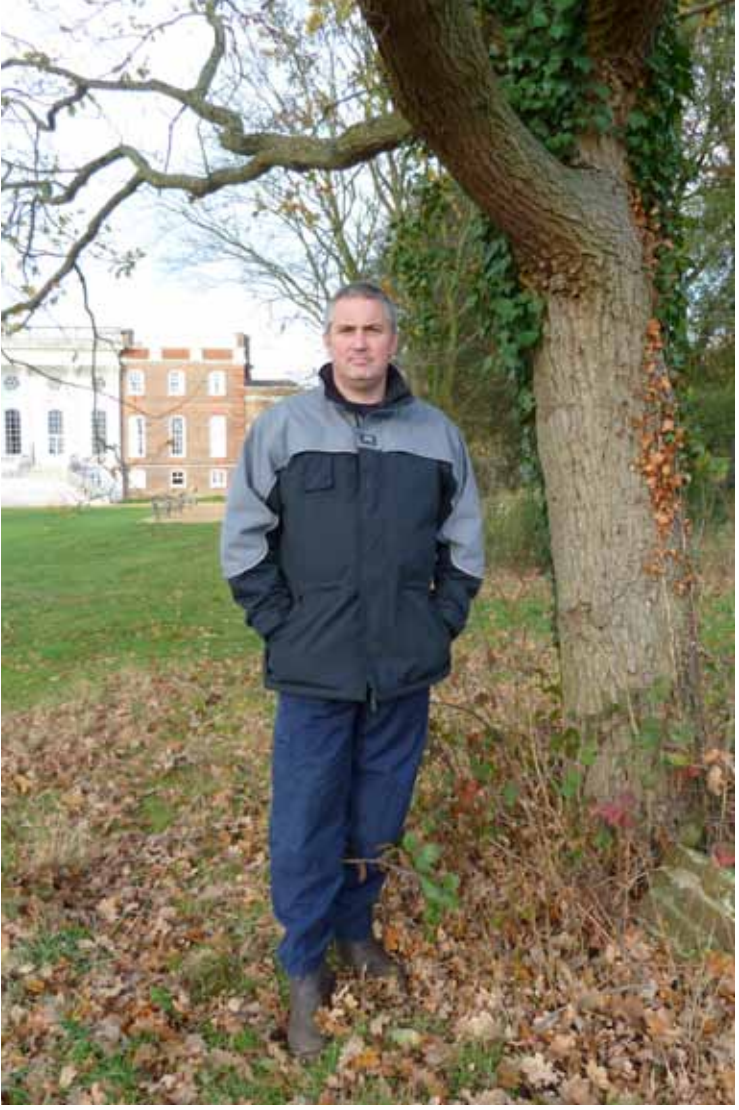
"This is the only option for fast effective control of OPM and safe spray delivery to tall oak trees that we have at the moment" said Adam. "Attempts to spray using portable knapsack sprayers from MEWP's and the use of mistblowers is ineffective, time consuming and not cost effective," he said.

We walked across the fairway to another hole where oak trees with a sighting of 10+ nests were sprayed the day before. Looking up into the canopy of a 30-40 year old Quercus robur we saw how deltamethrin had done the job and quickly too. OPM larvae were hanging upside down in their webbing clearly dead and dislodged from a previously secure position on the underside of a scaffold branch some 10m up the tree.

OPM nest collection is not an economically viable control option. The process is time consuming and ineffective as nests are bound to be missed despite best efforts. And there is the strain and fatigue of working in full PPE (Personal Protective Equipment) in the summer's heat combined with the increased risk of exposure to OPM's toxin. "We cleared this site last year through nest collection as the infestation was discovered too late in the season for effective control by spraying. This included one mature oak with 80+ nests." said Chris.

"OPM larvae have hatched earlier than expected this year due to the early spring which means we have been spraying at different sites since the beginning of May and are faced with a much more dynamic and fast moving situation," said Adam,

Some private parks, estates and local authorities opt for diflubenzuron, either straight away or after hitting OPM hard with deltamethrin in previous years. The selectivity of diflubenzuron means it is non-toxic to honey bees, lady bird beetles and other beneficial beetles, spiders and sucking insects. The disadvantage of diflubenzuron is that it is not as fast acting as deltamethrin ie. OPM takes 7-10 days to die following spraying, says Bartlett Tree Experts. Given their highly competitive commercial nature, golf clubs and courses are clearly not in a position to sacrifice fast and complete kill of OPM with deltamethrin in favour of environmental considerations, however laudable that may be.



**LEFT: Les Howkins with one of more than 700 oak trees across the course at The Richmond**

**ABOVE: Typical small nest on the underside of an oak branch** (Picture copyright RBG Kew)

**RIGHT: Newly emerged adult moth exiting the nest** (Courtesy Bartlett Tree Experts)

**"We've already budgeted for next year's OPM control operations. We'll spray with Deltamethrin next Spring, with the arrival of warmer weather and its influence on the timing of hatching of OPM larvae from the egg stage"**
Les Howkins

### Richmond resigned to spraying

Les is resigned to spraying every year against OPM even though the cost represents a 25% increase on his existing budget for pest, disease and weed control across the course.

"We have already budgeted for next year's OPM control operations. We will spray with deltamethrin next spring, the exact timing left to Bartlett and related to the arrival of warmer spring weather and its influence on the timing of hatching of OPM larvae from the egg stage," said Les, in early December 2011

"We essentially have no choice but to use deltamethrin because it is the most potent and fast acting product available, If OPM 'skeletonises' oak canopies or even kills the odd tree then it is not the end of the world, but harming and perhaps killing a club member is an entirely different matter, and we have many active members some of whom are well into their 80s.

"The Richmond has been entirely up front about OPM with its members who have reacted with interest and inquisitiveness, rather than anger or fear. They are pleased we dealt with the situation promptly as soon as the pest was identified," said Les.

I asked Les how OPM, which is spreading rapidly and now beyond eradication from the UK, would affect golf courses in general.

"The amount of money involved will clearly present a 'big hit' and drain on those clubs which are not in such a stable and fortunate financial position as The Richmond.

"But in practice golf clubs have no option but to contain and control OPM with its serious public health and safety dimension.

"Golf clubs which fail to take precautions to protect the health and safety of their members could easily find themselves facing a lawsuit for damages if a player gets 'stung' by OPM," he added.

The upside is that only oaks are affected and of course there are many other trees that golf courses can plant. And even though it would be a drastic measure they could fell existing oaks where legislation allows. But as Les says "oaks, and especially English oaks, are ideal for golf courses because they live so long and the fallen leaves are easy to get rid of."

### Poor prognosis for overall control

"Prognosis for the eradication of OPM from the UK is not good and is unlikely to be achieved," say Adam and Chris. Bartlett Tree Experts along with other reputable tree contractors are looking at all the tools in their arsenal for the management of OPM, whether spraying with deltamethrin, insect growth regulators and BT or nest removal or a combination of any of the above.

"Further research projects both in the UK and in Europe are looking at other options for OPM control and continued cooperation with all involved parties is essential Looking at experience with OPM in continental Europe the problem is only going to get worse.

We are all going to have to learn to live with OPM over the coming years," said Richard Trippett Area Manager and Aborist for Bartlett Tree Experts based at the Beaconsfield Office.