

GREENKEEPERS LIBRARY

Grown men are not supposed to hero-worship and upon reaching middle age there are few this reviewer holds in God-like awe. One can genuinely admire many men, golf writers like Longhurst and Darwin for example, or players like Harry Vardon, Bobby Jones, and Jack Nicklaus; though hero-worship is not something I reserve specially for them.

My hero – yes, I have one – is Harry Shapland Colt, the golf course architect who left an indelible mark on every course he ever touched. A golfer will find this man's genius in so many places that it is difficult to single out a single example, though Pine Valley springs to mind and is one Colt course I have played and would happily play to the exclusion of all others for the rest of my days.

Colt helped to change the face of some half million acres of this planet and his lasting legacy include such championship courses as Muirfield, Lytham St Annes, Wentworth, Hoylake, Sunningdale and Sandwich, together with lesser publicised gems the like of Swinley Forest, Tandridge and Worplesdon. If you are not impressed you must be a golfer from a different planet!

Views such as mine are shared by every golf course architect that ever drew breath, none more than Fred Hawtree, himself an architect of great note and the author of *Colt & Co, Golf Course Architects*, which is undoubtedly the best book to come across my threshold in a long, long time. The British Association (now 'Institute') of Golf Course Architects says that golf's classic attitudes should still inspire modern design, and this first publication under Fred's own publishing imprint – Cambuc Archive – accepts that belief. On it, Colt virtually founding a profession. Fred Hawtree describes Colt's career from schooldays to old age; fits in a wedge of letters which he and partners Alison and Morrison exchanged between 1939 and 1951 and then sums up his legacies and adds three contemporary articles by him and about him, plus a 300 plus list of their courses. Greenkeepers are essentially thinking men and have a great empathy with design excellence. As such they will appreciate more than any the thinking behind this great architect's unrivalled quest for perfection. I urge every reader to buy the book, – there will be no disappointment.

Colt & Co, Golf Course Architects, by Fred Hawtree, is published in hardback by Cambuc Archive at £28.50.

The making of a golf course is still shrouded in an element of mystery for most people and this may be understood more clearly when one considers just how complex the whole business can be and how few witness its nativity. An unusual, indeed unique, approach to lifting the veil is presented in the form of a novel – *Driving The Green*

– by John Strawn, a writer who has drawn on practical experience in the US golf construction business and who takes us from the developers eyes through to evolution of the architect's imagination.

We meet the clearing crew – bulldozers crashing through the undergrowth – and see lakes dug and dirt taken to form the course's characteristic outlines, rolls and plateaus. The shaper, the artist whose brush is a giant earthmover, is here too, painting the architects desires with the earth as his medium. Of course, the greenkeeper plays a vital part and it all adds up to an (earth) moving story which will fascinate and amuse both golfers and those connected with the vast golf industry.

Driving The Green – The Making of a Golf Course, by John Strawn, is published in hardback by Harper Collins at £16.99.

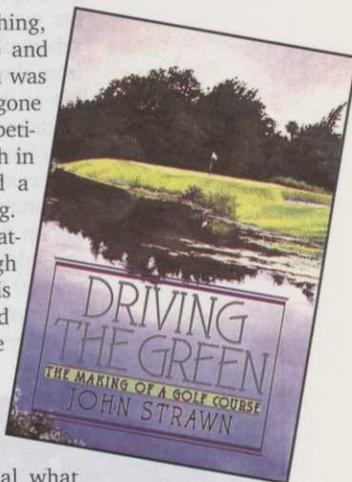
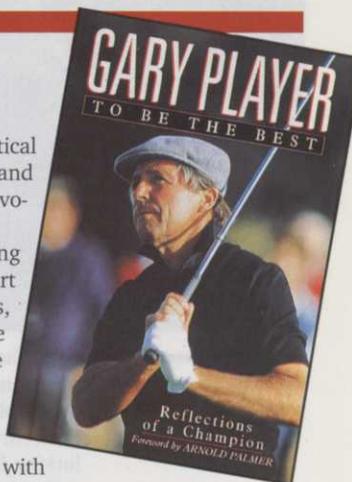
When the 'Big Three' really meant something, Gary Player was one of the famous trio and proved beyond doubt that a good little 'un was equal to any of the big guys in the world. He has gone on proving it through 40 or more years of top competitive golf and is still a force to be reckoned with, both in Regular and Senior Tour events. He has carved a whole new career that has his contemporaries reeling.

It is well known that Gary was and is a fitness fanatic and his daily regime still lasts an hour... though now fellow professionals who used to smile at his antics 20 years ago and dismissed him as some kind of crank follow him into the fitness caravan on the USA Seniors Tour.

The book, *Gary Player – To Be The Best: Reflections of a Champion*, is his autobiography, in which one of golf's immortals analyses his own success and that of other great players, to reveal what makes a champion both on and off the golf course.

This is an intensely private story and covers both the elation of victory and the downside of a career where he made a few enemies and was the subject of death threats. For my money, he remains a figure of admiration and a truly great golfer. If I had to rely on just one person to play to the pin from a bunker – and my life depended upon the outcome – I'd choose Gary Player. Written with Michael McDonnell, a delightful and astutely observant golf correspondent for over 25 years, the book is sheer joy and a worthy addition to any golfer's library.

Gary Player – To Be The Best: Reflections of a Champion, is published in hardback by Sidgwick and Jackson at £15.99.



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A one, two, tree

DAVID WHITE considers the effects of the mini-industry in donated trees to golf courses and suggests a three-point guide to their maintenance

Almost as popular as the perennial teak bench-seat, more and more greenkeepers are receiving donated young trees or saplings – given to the Club in memory of a deceased member who found pleasure on God-given golfing grounds – or finances from a widow to purchase a tree which the donor hopes will flourish in perpetuity.

Casting a watchful eye over the growth of this almost inevitable mini-industry, especially in south and south western retirement towns, it seems to me that there is danger lurking from at least three sides.

To begin, whilst varietal choice is often an emotive one – “dear old Marmaduke so much enjoyed the beauty of the willow” – the wise greenkeeper will attempt to bring influence upon the final variety of tree actually planted, based on his own local knowledge or perhaps guidance from an arboriculturist. After all, a pretty willow planted a few yards from the back of a green may look grand for a year or two, but as the roots begin to infiltrate the putting surface, Marmaduke’s memorial will become a vastly expensive folly and the object of blasphemy.

Second, the positioning of any tree is of paramount importance and great thought should be taken before deciding on a final site. In considering shadows look to the sun for guidance, always remembering (forgive the hackneyed phrase) that big oaks from little acorns grow, and be vigilant in ensuring that the little sapling being planted isn’t going to

cause future generations of golfers a high degree of heartache. Placement to the sides and rear of greens may seem a smart idea at the time, but flow of air and restriction of natural light can play merry havoc with the health of a putting surface. Planting trees in properly spaced clusters, to the right side of an open fairway if the contours and sun permit, seems to me a bonny way of breaking the monotony of those often boring straight out and back holes, together with providing an added hazard for the chronic slicer. Try always to think naturally when planting, bearing in mind that trees don’t grow in uniform lines, except on French roadsides!

Third, and most important of all, it is vital during the formative two or three year period of growth and development to ensure that a correct programme of maintenance is carried out. Rather like the golf course itself, young trees will prosper if care is taken and get very sickly if neglected. Imagine if you will a golf course untouched for a month – is the picture of horror imprinted in your mind? – so it is with young trees.

To begin, check all small trees during their first weeks in the earth. Ensure they are firmly implanted and carefully tread them in to keep the soil firm. Stems should be upright and although trees grow better without stakes, staking may be necessary – indeed almost obligatory – if we are to prevent errant golfers from hacking the youngsters to death! At the beginning the young tree will have been given its own little patch of ground, free from weeds and grass. Keep



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guide to arboriculture

it that way! Trees growing amongst weeds find it tougher to extract moisture than those on bare soil and it is of immense benefit to remove all grass and weed growth over an area of at least one square metre. Dense grass, particularly short mown grass, is particularly harmful and will substantially reduce growth in formative years.

Mulching conserves moisture for the tree by suppressing weed growth, at the same time keeping the ground surface cool. Organic materials such as leaf mould, straw, bark or compost have much to commend them as their gradual breakdown will fertilise the soil. Avoid very fine grades of peat and especially lawn clippings as these invariably interfere with the transit of air and water into the soil. The use of clear polythene sheeting, tree mats or old fertiliser bags (print side down please), held in place with stones or soil, can also be utilised as mulch.

How much water do young trees need? Except in drought conditions, not much is the answer, especially if they are mulch covered. As they grow and become larger, a thorough weekly soil soaking during any dry period will however be beneficial.

I can hear the howls of protest from those whose working day just isn't long enough and for whom new trees may well be just another headache to take on board. Take heart, for once planted, competition for water, light and nutrients amongst saplings can be very effectively controlled by the careful and diligent use of herbicides, such as Roundup PRO, which contain glyphosate. This is absorbed by weed and grass leaves and moves through the entire plant whilst remaining inactive in the soil and does not affect tree growth through roots. It can be effective on even the most stubborn of weeds, including brambles and bracken, though care should be taken to avoid applying herbicide to the tree itself.

A word or two on pruning, it being considered prudent to remove unwanted branches before they reach a thickness of two inches. Such action, whilst often looked upon as drastic on such tender life, lessens the risk of decay entering the plant. Remove one shoot if a double leader is growing, also dead or crossing branches. Remembering the height of a golf swing, keep lower branches clear but don't exceed one third of the total height of the tree.

If your course already has trees which have suffered from stress and look set to die, consider the possible use of the innovative 'Verti-Mulch', common in the States and now available in the UK. The principle is to bore six holes around the drip line of the tree about 40cm in depth with a 6cm diameter. The majority of the bore hole is then filled with 'Verti-Mulch' and topped with sand. Water filters through the sand to the additive, which draws water like a sponge and provides nutrients to the stressed root system.

Finally, consider the option which tree surgeon Keith Banyard of Witchampton in Dorset took, that of transplanting local species of semi-mature white birch and English Oak trees to the Wareham course from a nearby estate. Experienced in handling such conservationist projects, he utilised a Vermeer TS 50 Tree Spade mounted on a tractor, which required only one person for the whole operation. The spade controlled the size of hole when removing the tree and caused little or no damage to the turf. The transformation was amazing, with more adventurous holes in play in no time.



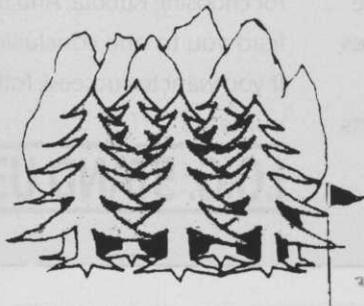
Effects of Roundup Pro treatment around young tree in tree shelter

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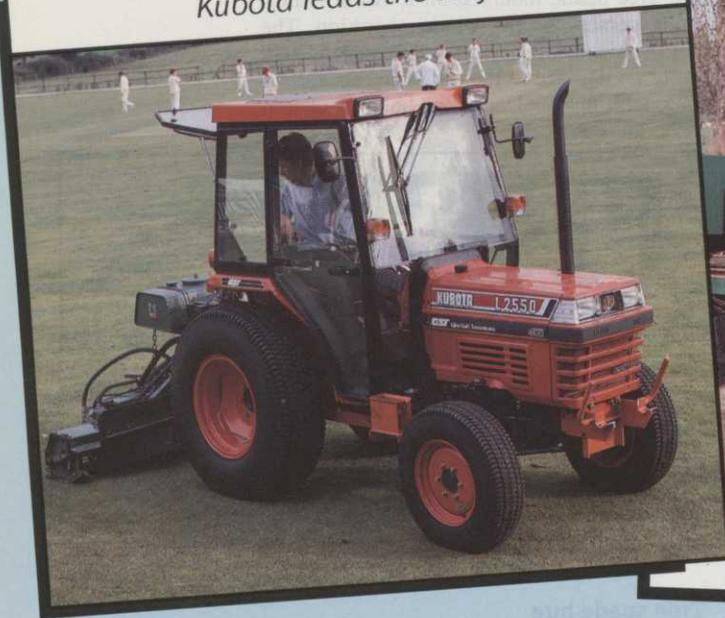
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THE POWER THAT LEADS

AD REF 86



COMPACT

R A C T O R S

Never underestimate the compact tractor, advises HUGH TILLEY. In many areas they are more than a match for their big brothers

Compact tractors have become an almost uniquely Japanese phenomena, but there are several European models with similar size and feature attributes. In the UK compacts are marketed under their own names, for example as Kubota or Iseki, and/or in the livery of several major UK tractor suppliers, such as Ford, Massey-Ferguson and John Deere. The important feature of their development must be the Japanese dominance in small diesel engine design and production. Built up around their success is an entire UK industry devoted to producing attachments and implements, these ranging from cabs and controls through all types of mower to wrap-around loader/backhoe combinations.

Features which have contributed to this popularity are their manoeuvrability and ease of use, together with the fact that they offer most of the features expected from a modern tractor such as PTO, hydraulic linkage and external services, at a very competitive price. In terms of power, 'compacts' range from about 12 hp to about 40 hp or above, although it could be debated that they lose their compactness at the top end of this power range, equating to the smaller tractor in terms of price, weight and size.

The majority of compacts have a conventional clutch/gearbox transmission, however most manufacturers produce one or more hydrostatic models, generally in low or mid power ranges where the engineering is not too expensive or power loss too noticeable. The advantages of instant clutchless forward/reverse and infinitely variable



The Charterhouse Turf Tidy, mounted on a Kubota L275

speed for mowing or loader work are obvious. Selection of a conventional manual gearbox should take into consideration the work for which the tractor is required – will there be sufficient low gear ratios for core tining etc.?

Power is of vital importance in the ability to undertake the tasks required on a golf course, but weight usually conferred with greater power is also occasionally necessary for stability – and even for grip. Even so, compacts should not be under-estimated, because with four wheel drive, more efficient engine/transmission systems and a well set-up implement, most are able to compete with their bigger (and more expensive) brethren. There are three basic options for utilising tractor power: traction, power take-off (PTO) and hydraulics, these latter making 'tractor' a misnomer. Tractors have become prime-mowers and main sources of power – and this is particularly true with the compact tractor.

Traction is an essential component on many operations – perhaps trailer work typifies these on a golf course – but other draught operations include ground cultivation, scarifying and rolling. All modern tractors go back to the late Harry Ferguson's principles of weight transfer – of imposing

the implements weight on the tractor (rear) wheels to increase grip – in fact Mr Ferguson would thoroughly approve of the concept of the compact. The Ferguson type trailer has the axle set right at the back with coupling close under the rear axle to impose much of the load weight there. Four wheel drive did not come into the original concept, however it provides a spectacular advantage in grip and is not an expensive addition at 'compact' size. It also provides extra weight and strength for the front axle and power steering, all useful attributes for other applications such as front loader work. Another important factor in the grip equation are the tyres. Traction tyres are essential to maximise grip, especially when on bare soil, but they are not user friendly. The simple → 46



The SISIS Powadrag linked to a Ford 1220

■ The author, Hugh Tilley, is a technical journalist whose specialised knowledge includes modern greenkeeping machinery.

COMPACT TRACTORS

45 → answer is to have two sets of wheels – or buy a set of wheel chains (sold for forestry).

The power take off, invariably abbreviated to PTO, has become perhaps the most important point from which to extract power from the engine and is usually the most efficient. Rear PTO is standard, but front and mid PTO options may be available and found ideal for mowers and other implements, perhaps with limitations of power output and/or speed. It may be possible to mount an extra hydraulic pump or similar to the front of the engine crankshaft and this can be useful for uprating performance of loaders or for powering a hydrostatic mower. The British Standard PTO speeds are 540rpm, or 1000rpm (for higher power output), but some tractors offer other variations – which may need adaptation to the implement. 'Live' PTO drive is also an essential modern requirement – with the PTO having an independent clutch.

A three point linkage was the operation system devised by

Harry Ferguson for implement carriage and control – this having become standardised in categories (Zero, One and Two) according to power and size – so that in theory any implement should fit any similar category tractor. In practice this does not always work, but the exceptions are reasonably rare. More frequent are

The Amazone Sweeper mounted on an Iseki 320

variations between link end and PTO measurements. Lift control may be a simple spool valve or a quadrant and lever – normally controlling the position of the links – however higher specification models also have, or can have, draught control to automatically adjust the depth (draught) according to tractive effort.

Of growing importance are external hydraulic services, used to operate front loaders, lift and fold mowers, control splitter depth and tip trailers. These services – and the use and abuse of them – contribute to more problems in compact tractor operation than any other cause. Often this is due to a lack of specification or knowledge by suppliers of tractor and implement. A crucial fact is to realise the difference between single and double acting spool valves and hydraulic rams. Spool valves vary in type and operation so it is essential to ensure the right one is matched to each specific implement.

Cab or no cab is another question of individual preference and use, ROPS being the compact norm. A top specification cab provides a (relatively) quiet, cool, dry and clean environment without too much impediment to getting on and off, but adds over £1,000 to the price.

A loader can be extremely useful on a compact, however if required for intermittent use ensure that it is readily detachable. For satisfactory service it should be fitted to a robust tractor or have adequate chassis reinforcement, for many compact tractors owe much of their light weight and price to the use of pressed and folded steel in place of traditional castings.

Compact tractors offer exceptional value for money and great versatility and can undertake most of the tasks required on a golf course. However, they should not be expected to do the same work that is expected of a 50-70 hp tractor, nor with implements designed for such vehicles.



■ The role of formulations and packaging in the agrochemical industry is undergoing a transformation. Regulatory authorities, led by the UK, expect manufacturers to build the most appropriate technologies into their product – in other words minimise hazard to operators and the environment.

ICI have been at the forefront and the result is now seen in a new bottle, funnel shaped with an isolating handle to prevent lodging when emptied, which requires only one hand to pour and with a 63mm wide neck prevents 'glugging'. Three ICI products will initially be packed in these, the revolutionary Water Dispersible Granular (WDG) herbicide formulations Groundhog, Speedway and Soltair. "Now 15 years after its introduction we are witnessing a marked trend toward WDGs," said Roger Mossop, ICI Professional Products Marketing Manager.

■ The buoyant Jacobsen division of Textron has announced a joint marketing agreement with the turf care equipment manufacturers, Smithco. The agreement covers the international distribution of the complete Smithco range and will be available under the newly created name of Jacobsen-Smithco, the products to feature under the familiar Jacobsen orange livery.

Pictured after signing the agreement, are Rene Orban, Bill Kenney, Dick Miller and Tom Carter.

■ Marketing Link and Milliken Chemicals, through their UK distributor, Farmura Ltd, have launched a "Better-Way-to-Spray" campaign to introduce greenkeepers to the benefits of Blazon spray pattern indicators. Greenkeepers who purchase 12 litres of Blazon before September 30th will receive a golf towel and the opportunity to join the BIGGA delegation to the GCSAA Convention in New Orleans. The successful winner, chosen in a draw by BIGGA Chairman, George Malcolm, will be invited to Aldwark Manor to receive the prize.

■ Fisons Horticulture have appointed Avoncrop Amenity Products of Sandford, Bristol, as a main distributor of Fisons professional turfcare and amenity products. Avoncrop will cover the south west and south of England.

■ In the Tillers Fibreturf competition held at the Landscape Industries Exhibition, the £100 prize for guessing the number of fibres in a 10 litre bucket of Fibreturf rootzone was shared between John Churchward of Torquay and Mr Kennedy of Worcester G&CC. They were nearest to estimating 858,500 fibres which, if laid end to end would contain enough fibres to join London with Moscow! Tough stuff indeed.

■ Turf Irrigation Services, the UK's major Toro Irrigation distributor, have appointed Irriserve of Preston as an Authorised Area Dealer and Installer operating in Lancashire and Cumbria.

■ Industrial Power Units (IPU) have set minds at rest following the closure of JLO GMBH and the news that Technamotor UK will distribute JLO spares in the UK from October 1st.

IPU is a diverse company and JLO sales represented only 15% of their overall business. Having the Dori range of grass maintenance equipment and, more recently, having added Ferris rotaries to the stable, IPU are very confident of their future and only recently delivered six Ferris 36" Hydrostatic rotaries to Mid Glamorgan's maintenance wing, TransPlant. Our picture shows the handing-over.



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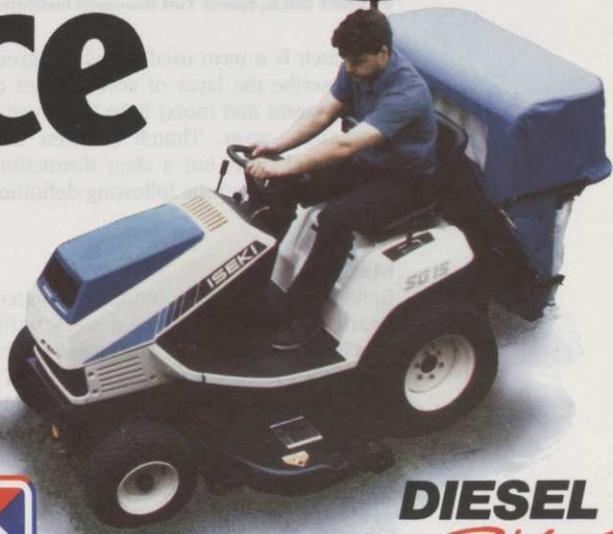
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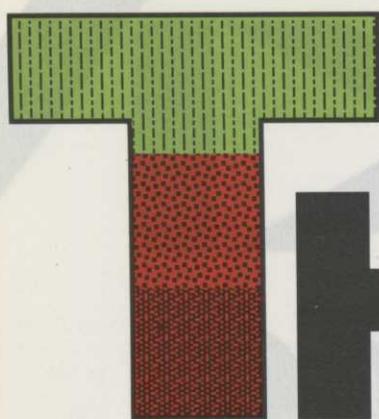
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Tackling

HATCH

by **ANDY COLE**, Sports Turf Research Institute

Thatch is a term used loosely in greenkeeping circles to describe the layer of accumulated organic matter (old leaves, stems and roots) found between the soil and its live vegetation cover. Thatch is often used to describe all deposits of fibre, but a clear distinction would be helpful from the start and the following definitions can be used as a guide:

Mat/Litter

Generally found in less intensively managed turf, where the sward is cut perhaps once a week without boxing off the clippings and very little additional mechanical work undertaken. This results in a loose build up of grass clippings and decaying plant debris in between the grass stems at the base of the sward. It is more characteristic in old and neglected lawns or areas of turf which are not so intensively managed, such as semi-rough.

Fibrous Thatch (Fibre)

Fibre is more commonly found under acid, moorland turf which tend to favour the finer *Agrostis* and *Festuca* grass

species. It develops as a hard, brown, often dry layer and is sometimes referred to as resembling coconut matting with its rough, wiry texture. In dry weather, these fibre layers can make the turf prone to drought stress and shown symptoms of dry patch, particularly on featured areas; the fibre drying out and acting like a thatched roof. Mechanical aeration and treatment with a proprietary non-ionic wetting agent can be employed to overcome the symptoms by aiding water penetration.

Spongy Thatch (Thatch)

Thatch is used to describe the yellow/brown, foul smelling, moisture retentive material producing anaerobic conditions often associated with wet, compacted, poorly drained soil and waterlogged throughout most of the year. *Poa annua* invariably predominates the sward, since this species survives better under these conditions than the finer grasses, but questions still arise as to whether *Poa annua* causes thatch or whether thatch is encouraged by *Poa annua*.

Leaf growth is most productive in the spring and early autumn (less so in mid-summer) while root growth more so through late autumn and early winter, ie. when not very cold. The life-span of each leaf, root, rhizome is relatively short and a continuous cycle of tissue production and death takes place to perpetuate these perennial grass species. Natural decomposition of plant organic matter depends on environmental conditions and seasonal fluctuations, with thatch accumulation resulting from tissue production proceeding at a rate in excess of that for decomposition.

Whether turf thus develops thatch or not depends mainly on plant growth rate, the composition of the plant tissues, maybe the quantity and type of pesticide being used, as well as fertility, aeration, temperature and moisture in the thatch environment. Under intensively managed turf, scarification/verticutting also has a role in keeping thatch build-up under control.

Decomposition of plant material is carried out by soil micro-organisms, microfauna and macrofauna in succession; no one species seems to have all the necessary enzymes

PROBLEM		CURE
<p>Grass Composition Annual meadow grass overwatered and overfertilised promotes rapid accumulation of thatch. Thatch in turn promotes shallow rooted species, hence more thatch – the problem feeds upon itself!</p> <p>Thatch Restricts root penetration, therefore less drought tolerant. Pitchmarks, soft in winter, surface moisture encourages moss.</p> <p>Compaction Restricts water movement, promotes shallow rooting and annual meadow grass, generally poor growing conditions.</p>		<p>Grass Composition Improve grass composition by sound management practices to promote bent and fescue species.</p> <p>Thatch Removal of existing thatch by hollow tine aeration. Encourage natural thatch breakdown by getting air into the surface by regular aerating. Prevention of further accumulation by verticutting, etc. and again by sound maintenance.</p> <p>Compaction Relief of compaction by slit/solid tine; Vertidrain, Twose Vibrating mole plough, compressed air.</p>

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What the eye can't see...



LOG STAND J58



required to break down the components of higher plants. Certainly, the sequence and interactions are complex and different from one habitat to another but is thought to be initiated by fungal activity, bacteria and nematodes feeding on the bacteria/fungi. A succession of micro-organisms is essential if total decomposition is to be achieved, each group feeding on the residues remaining from a previous groups' activities. More detailed research is required to determine closer relationships.

Micro-organisms require nitrogen to decompose organic matter, which is itself rich in carbon. A low C : N ratio (< 20 : 1) favours decomposition by micro-organisms. Unfortunately, nitrogen can be rapidly leached out of the thatch layer which allows the C : N ratio to become rather high. It has been shown that when frequent, moderate applications of fertiliser are applied, thatch decomposition can be accelerated, but if there are excessive fertility levels, turf production rates are increased but not decomposition rates. Therefore more organic matter (thatch) becomes deposited and nitrogen in the soil is not available to the

increased annual meadow grass, worm and weed activity, with the possibility of take-all patch developing. Lime is therefore only recommended after careful consideration and not as a matter of routine.

Temperature, moisture and soil aeration all play a significant role in the thatch situation. Dry conditions may inhibit thatch breakdown and under prolonged dry weather the thatch can be difficult to re-wet, the surface actually repelling water. Excessive moisture and lack of air in the soil, either as a result of over-watering, heavy clay soil or compacted layers, produce the characteristic anaerobic, foul smelling, spongy thatch, which can often be reduced through better management practices or installation of a drainage system as required. All biological activities are temperature dependent, therefore increased thatch production is to some extent counteracted by increased microbial activity and temperature becomes less significant than aeration and moisture.

In practice, sound basic maintenance work can be geared to minimising thatch problems, for example minimising

micro-organisms in the thatch.

Where fibre is a problem, with a tough, hard, brown fibre layer in the turf, over-acidic conditions could be added to the situation – breakdown often being most rapid at about pH 6.0, the rate decreasing rapidly as acidity or alkalinity is dramatically increased. In rare cases it may be necessary to raise the pH level, but the side effects could prove disastrous, particularly on fine turf with

'In practice, sound basic maintenance work can be geared to minimising thatch problems'

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AD REF 330

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AD REF 258



HATCH

'Addition of a sandy top dressing dilutes thatch and increases its permeability'



49 → ing the use of water and fertiliser to maintain grass growth but not force a lush sward. Scarification/verticutting also has an important part to play during the growing season to lightly flick through the turf, removing creeping growth and surface litter. A comb attachment for the mower is useful in this respect.

A more thorough verticutting treatment in early autumn, setting the blades to cut into the turf, can be beneficial, but may not resolve the problem alone. Hollow tine aeration in the autumn or spring is very helpful as this physically

removes a small proportion of the unwanted fibrous material, which can be replaced with a more free-draining sandy top dressing – a type of soil exchange. It must, however, be appreciated that hollow tining using 12mm diameter tines at 50mm centres removes only 5% of the surface, which is a relatively small proportion and must therefore be continued over a number of years.

More recently, with the introduction of the Coremaster 12 fitted with quadra-tines, it may be possible with severe problems to hollow tine through the summer without undue

surface disruption, this coupled with monthly top dressing. Hollow tining can also be used to relieve compaction or barriers near the surface, but for deeper seated drainage problems the use of sub-aerators such as the Verti-Drain or Twose Turf Conditioner is useful. Solid or slit tine aeration must also be carried out on a regular basis to relieve surface compaction and permit air into the soil to promote natural thatch breakdown and encourage deeper rooting.

The addition of a sandy top dressing dilutes thatch and increases its permeability, providing a more open texture which can be attacked by micro-organisms. Top dressing with a sandy soil is also believed to prolong the available nitrogen supply to the thatch layer, which in turn promotes more decomposition. The objectives are to intersperse sandy top dressing with the thatch to keep it open and promote natural breakdown – not just to bury it. Aeration through the winter helps with the 'mixing process', as well as promoting air circulation.

Where the thatch layer exists for several centimetres, such as on an old golf green, it may be possible to cut the turf thinly; cut and discard the layer of thatch, rake up the turf bed and replace the turf or, indeed, remove the turf and thatch in one go and either seed or turf. A drastic measure perhaps, but not to be discounted in extreme circumstances. It should be realised, however, that unless the cause of the thatch is eliminated the thatch will merely tend to accumulate once again after the turf has been replaced. Conventional maintenance should be stepped up before such measures are considered.

● The author, Andy Cole, until recently an advisory agronomist with the STRI, is now a lecturer in greenkeeping at the Warwickshire College of Agriculture.

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