be course without any specific finesse, then a compact tractor will do all, and probably more, than you ask of it. If, however, you feel your course deserves the light tread of a machine which has been purpose-designed to maintain turf with matched implements throughout the year, carry loads 'on-board' with minimal risk of surface marking and move about swiftly and quietly without discomfort, then you need to look seriously at a specialist turf vehicle.

At the end of the day, you will probably decide that you want both and this is likely to be an excellent decision when aiming solely for the optimum solution to year-round course management and maintenance. It's then just a question of persuading the person holding the purse strings! Good luck.

### COMPACT TRACTORS UP TO 26HP

<table>
<thead>
<tr>
<th>Make</th>
<th>Model</th>
<th>Power</th>
<th>Drive</th>
<th>Transmission</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>John Deere</td>
<td>670</td>
<td>19hp</td>
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<td>M</td>
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</tr>
<tr>
<td></td>
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<td>M or H</td>
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<tr>
<td></td>
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<td></td>
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<td></td>
<td>H</td>
<td>5522</td>
<td>22hp</td>
<td>H</td>
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<tr>
<td>Iseki</td>
<td>TX2140F</td>
<td>16hp</td>
<td>4</td>
<td>M</td>
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<td>TX2160F</td>
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<td>TG115F</td>
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<td>H</td>
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<tr>
<td>Kubota</td>
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<td>12.5hp</td>
<td>4</td>
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<td>B7100</td>
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<tr>
<td>Lamborghini</td>
<td>Runner 250</td>
<td>25hp</td>
<td>4</td>
<td>M</td>
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<td>Massey Ferguson</td>
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<td>16hp</td>
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<td>21hp</td>
<td>4</td>
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<tr>
<td>Same</td>
<td>Solaris 25</td>
<td>25hp</td>
<td>4</td>
<td>M</td>
<td>£540/1000 POA</td>
</tr>
</tbody>
</table>

Key: Drive: 2 = two wheel drive; 4 = four wheel drive; 2 or 4 = model available in either two or four wheel drive versions; Transmission: M = gearbox; H = hydrostatic; PTO: Rear power take-off speed (s) in rpm; POA = Price on application.

### SPECIALIST TURF MAINTENANCE VEHICLES

<table>
<thead>
<tr>
<th>Make</th>
<th>Model</th>
<th>Engine Power</th>
<th>Transmission</th>
<th>Wheels</th>
<th>Features</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cushman</td>
<td>Turf Truck</td>
<td>22hp, 27hp P</td>
<td>M</td>
<td>3 or 4</td>
<td>2S; H; P</td>
<td>POA</td>
</tr>
<tr>
<td>John Deere</td>
<td>1800 Utility Vehicle</td>
<td>18hp P</td>
<td>H</td>
<td>4</td>
<td>2S; PS; H; P</td>
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<tr>
<td>GMV</td>
<td>Ground Maintenance Vehicle</td>
<td>43hp</td>
<td>M</td>
<td>4</td>
<td>2S; H; P</td>
<td>£14750</td>
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<tr>
<td>Huskies</td>
<td>Hurruck</td>
<td>23.5hp D</td>
<td>H</td>
<td>3</td>
<td>2S; PS; H; P</td>
<td>£10750</td>
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<tr>
<td>Jacobsen</td>
<td>Workhorse</td>
<td>23.5hp D</td>
<td>M</td>
<td>3</td>
<td>2S; H; P</td>
<td>£9995</td>
</tr>
<tr>
<td>Sisis</td>
<td>Hydromain</td>
<td>25hp D</td>
<td>M</td>
<td>4</td>
<td>2S; P</td>
<td>£11900</td>
</tr>
<tr>
<td>Tore</td>
<td>Workman</td>
<td>27hp P</td>
<td>M</td>
<td>4</td>
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<td></td>
<td>3000</td>
<td>21hp D</td>
<td></td>
<td></td>
<td>£12500</td>
</tr>
</tbody>
</table>

Key: Engine type: P = petrol, D = diesel; Transmission: M = gearbox, H = hydrostatic; Features: S = number of seats, PS = power steering, H = can be used with hydraulically powered attachments, P = can be used with PTO powered attachments. **All information was compiled from details supplied by each manufacturer. Prices shown represent the basic starting price for each of the models and are subject to VAT. For space reasons, data has been kept to a minimum and shows solely the base model.** For the full specification of any machine, together with its optional equipment and accessories, please contact the supplier's sales department on the telephone number given.
The great golfers of his day

Harold Hilton: one of Apawamis Championship appearances are related in detail creating delightful suspense as the events proceed. The author, John Garcia, has traced Hilton’s golfing life and brings out his eccentricities, his achievements and his disappointments, giving a unique picture of one of the greatest ever amateurs. Harold Hilton: His Golfing Life and Times, is a lively account of perhaps the greatest British amateur golfer and of his contemporaries. It is enhanced by a foreword by Herbert Warren Wind.

Limited to 750 numbered and signed copies, Harold Hilton: His Golfing Life and Times is priced at £25 including postage, available from Grant Books, Victoria Square, Droitwich, Worcs. WR9 8DE.

Turfgrass Science, Agronomy Monograph 32, updates some of the topics from the first monograph and offers detailed information on many new topics. As such, Turfgrass complements information contained in the earlier monograph and various turfgrass textbooks and reference books. The monograph is divided into five primary sections. The first explores the turfgrass industry and includes chapters on historical aspects of research and education, current status of the industry, and artificial turf. The turfgrass physiology section focuses on ecological aspects, energy relations and carbohydrate partitioning, and stresses due to salinity, temperature, shade, and traffic. The third section is on soils and water and emphasises soils and amendments, nutrition, fertilisation, water requirements, and irrigation. The management section offers chapters on energy conservation and efficient maintenance, integrated pest management, turfgrass management operations, and plant growth regulators. The last section addresses research techniques related to field and controlled-environment research, diseases, insects, weeds, and breeding.


Published by the American Society of Agronomy, Turfgrass Science, Agronomy Monograph 32, hardback 828 pages, is available from the ASA, 677 South Segoe Rd, Madison, Wisconsin 53711-1086 USA. The cost is $42.50 including postage. Prepayment in US dollars is required.

Harold Horsfall Hilton came to the golfing scene when golf was exploding into a popular sport with new clubs being started all over Great Britain. Hilton was to some extent a very private man but his famous win of The Open in 1892 brought him to the forefront of the great golfers of the day. Incredibly he won The Open again in 1897 before taking the Amateur Championship. He lost the finals of the Amateur Championships of 1891, 1892 and 1896 and it was not until 1900 that he first captured the trophy. Hilton went on to a repeat victory in the 1897 Open and also took the Amateur Championships of 1891, 1911 and 1913. He became the first and only British Amateur to win The Open. Perhaps his greatest year was 1911 with his win of the Amateur Championship, a near miss in The Open and his victory at Apawamis, perhaps the greatest jewel in his crown, ending with the controversy of the ‘rock’ incident - which is fully explored.

The stories of these contests and all Hilton’s other major tournament appearances are related in detail creating delightful suspense as the events proceed. The author, John Garcia, has traced Hilton’s golfing life and brings out his eccentricities, his achievements and his disappointments, giving a unique picture of one of the greatest ever amateurs. Harold Hilton: His Golfing Life and Times, is a lively account of perhaps the greatest British amateur golfer and of his contemporaries. It is enhanced by a foreword by Herbert Warren Wind.

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FRUSTRATION

S
ow play, as at many other clubs, has been a contentious issue for Lyneham Golf Club in Oxfordshire since the course initially opened a little over two years ago. Now, at the approach of the first anniversary of the completion of the clubhouse and all 18 holes, positive steps are being taken to eliminate the problem for the benefit of players and the greenkeeping staff alike.

"There is little doubt that slow play is one of the greatest single frustrations on most courses in the country," commented general manager, Neil Biggs. "We appreciate that it is not unique to Lyneham but, being a new club, we are determined to nip the problem in the bud before members and visitors become set in their ways."

The result will, he hopes, improve not just the pleasure of playing a round at this scenic course, but enable the green staff to carry out their work with fewer hold-ups or interruptions.

Lyneham Golf Club is situated in the gently rolling Evenlode Valley, midway between Burford and Chipping Norton. Created out of former farmland, it covers 144 acres, measuring 6,808 yards with a par of 72. The club is privately owned by a founding board of directors, with both membership and 'pay and play' facilities open to the general public. In less than a year, membership has grown to almost 700, making the course very busy at weekends, public holidays and during fine weather.

"The problem of slow play was first drawn to the attention of members in a newsletter more than 12 months ago," explained Mr Biggs. "However, the ever increasing demand for golf brought matters to a head at the end of last year. Quite simply, we had to take urgent steps to speed up throughput which, at certain times, was painfully slow."

The club insists that no ball is played to a green while the flag remains out. However, this has not always prevented frustrated players firing a 'warning shot' at a greenkeeper or slow-moving group and will insist on play being speeded up if one group is falling behind. To this end, the directors have drawn up guidelines with regard to the acceptable times for a typical four ball match to reach specified points around the course. These times are being posted on prominent signs alongside the 4th, 7th, 10th, 13th and 16th tees, with a guide-line time of 3 hours 40 minutes for the match to be back in the clubhouse. Two and three ball matches should be even quicker!

- Other measures include making one player responsible for the speed of play, and course etiquette, in his or her match; restricting start times for visitors until after 10.30am at weekends; and using a first tee starter during busy periods.

Neil Biggs commented that the process was principally one of education and that more experienced players were equally as likely as beginners to be responsible for slow play. "Our letter states that there is only so much that the club can do. The rest is down to the players," he said.

Guidance given to golfers includes being ready to play a shot immediately the way ahead is clear; keeping up with the match in front, rather than simply just ahead of the match behind, while being prepared to invite a faster match through; walking briskly between shots; clearing the green quickly when the last player has holed out; and being aware that in a friendly game or matchplay, there is no need to hole out on every occasion.

The result of the letter has been a 'dramatic improvement', pointed out club secretary, Cyril Howkins. "Players are now thinking and talking about the time taken to complete a round and even apologising if they exceed our guide-line times by a few minutes, promising to do better next time," he said.

And what of the greenkeeping benefits? "It can be painful at times watching a four ball putt out," comments head greenkeeper, John Heslip. "If we just happen also to be working on that green, there can be a great deal of wasted time waiting for the match to play through. I'm hopeful that the steps taken will lead to less interruptions, less waiting and increased safety on all parts of the course."

The club insists that no ball is played to a green while the flag is out. However, this has not always prevented frustrated players firing a 'warning shot' at a greenkeeper or slow-moving match ahead. The same applies on the fairways. "We do all we can to stay clear of matches," said John. "However, the demand for golf means that there are many times when we have to work in harmony with the golfers. It needs give and take. We have to work in harmony with the golfers. It needs give and take on both sides, but if all players moved along a little quicker, having repaired their pitch marks and replaced their divots, it would make our job easier and eliminate much of the wasted time we spend on the course."

The editor will be pleased to hear from readers with views - different, unique or downright controversial - on ways of speeding up play. The best ideas will be published.

BRUCE STANLEY reports on the activities of one golf club determined to ease the curse of slow play

Tackling Frustration

John Heslip, head greenkeeper at Lyneham Golf Club: 'Slow play causes frustration among players and green staff alike.'

GARDENKEEPER INTERNATIONAL April 1993 33
'Mini-Gold', the latest addition to the 'Longlife' range from ICI Professional Products, is a high nitrogen (31:0:0) mini-prill fertilizer. It can be used on all types of turf, particularly golf greens and bowling greens. 'Mini-Gold' is a sulphur coated urea fertilizer giving a slow release of nitrogen lasting up to 14 weeks. 'Mini-Gold' has the added benefits of eliminating the risk of scorch as well as reducing nitrate leaching.

The choice of application rates provides the turf manager with flexibility, making 'Mini-Gold' an ideal component of any turf fertilizer programme.

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Facts about

DAVID LAWSON takes a practical look at nutrients for your golf course

It is worth remembering that all soils contain some plant nutrients. Even a rootzone comprised of sand contains potassium and magnesium with possibly some phosphate. However, the actual amounts of nutrients held within the soil 'reserves' are governed primarily by the proportions of organic matter and clay minerals present. The soil organic matter, in particular, holds a store of nitrogen, sulphur and phosphorus which with time is released to the turf through the activity of micro-organisms. The higher the soil's temperature and moisture contents, the greater the rate of nutrient release. For this reason there is normally a flush of turf growth in the autumn when the soil is warm and wet.

In the indigenous soils of the golf course fairway the organic matter supplies adequate amounts of nitrogen and other nutrients for turf growth. These organic nutrient reserves are continually replenished from leaf clippings and dead roots, which break down to form soil humus. In addition, the turfgrass and soil receive nitrogen dissolved in rainwater. Although the actual amount will vary from region to region, the total amount of nitrogen supplied annually in rainfall is between 3 and 4 grams per square metre. This is equivalent to the amount of fertiliser nitrogen applied in an average fertiliser dressing. Clay material in fairway soils will also hold short-term reserves of nutrients.

Therefore, most fairways do not require any fertiliser on a regular basis. However, badly worn approaches and walk-off areas will benefit from an annual application of nitrogen fertiliser. A convenient way of doing this is to apply a slow release fertiliser in the spring. Resin coated fertilisers are particularly effective as they will support even growth right through the growing season from one spring application.

Nitrogen

It is on the tees and greens where fertiliser application is essential. By far the most important fertiliser nutrient for turf is nitrogen, which has to be applied to close mown turf in order to allow the grass to recover from wear and tear. The reserves of nitrogen within the soil or from top dressing materials and rainfall are not adequate, particularly as nitrogen is being removed in clippings.

The most severely nitrogen depleted situation is the sand-only rootzone. Trials at the STRI have shown that for fescue/bent turf 25 g/m² of nitrogen (N) should be applied each year. Using normal, soluble fertilisers this will require at least seven separate dressings each year, as no single dressing should exceed 4 g/m² of nitrogen. On rootzones constructed from sand-soil mixes the organic soil nitrogen has been so diluted that again a relatively high input of fertiliser nitrogen is required: about 20 g/m² of N per annum. This would be applied within a minimum of five dressings where soluble fertilisers are used.

Because of the low 'background' nitrogen content of these free-draining sandy constructions, it is often necessary to extend the fertiliser programme at either end of the main growing season. This allows the turf to recover from wear during the winter months.

Scan-Seed

Seed spraying is an accurate, convenient and highly economical way of sowing grass seed, especially in difficult areas. The seed is effectively glued to the ground with Scan-Binder, this enables sowing to be carried out even where top soil is limited or missing. Scan-Binder is used to glue the seed in place and is also designed to prevent the seed from blowing or being washed away before it has a chance to germinate.

Scan-Seed available in Scotland and the North of England only through Stewarts, is ideally suited for use under UK conditions having already proved itself in commercial projects throughout Scandinavia.

Scan-Seed works by vibrantly mixing grass seed with water, fertiliser and scan-binder glue, an essential catalyst in the achievement of maximum results.

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ORGANITE fits into any fertiliser programme. Ideal for sportsgrounds, fairways and tees.

ORGANITE granular is also suitable for use on all fine turf areas and is designed to meet the demands of the modern turfgrass manager.

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Tel: 0962 776 441

For further information on any of the above, please contact John Walker on 0860 424430 or Ritefeed at Electron House, Electron Works, Brook Street, Preston, Lancs PR1 7NH
Facts about FERTILISER

35 On these rootzones it is perfectly acceptable to use traditional soluble fertiliser products based on ammonium sulphate. The inclusion of organic nitrogen in spring and early summer is also worthwhile, but it is important not to rely on organic products for the main source of nitrogen as severe disease problems can occur. Sand-texture rootzones do quickly become very acidic, so to counteract this less acidifying fertiliser materials can be used. Liquid nitrogen fertilisers normally contain urea-nitrogen, which is only half as acidifying as ammonium sulphate. In addition, these liquid products are a convenient way of applying small amounts of nitrogen at either end of the main growing season. These liquid products vary dramatically in the amounts of nitrogen which they contain and it is difficult to ascertain how much is being applied with one application. Advice on this can be obtained from the STRI.

Slow release nitrogen fertilisers have been developed largely to reduce the number of fertiliser applications and to ‘even out’ the pattern of growth. Such advantages would be seen most obviously on high sand content rootzones. However, care should be taken in their use on golf greens. Materials which work through their low solubility (IBDU and ureaform) do not have the same ability to discourage annual meadow-grass establishment as ordinary soluble products containing ammonium sulphate. The long-term effects on turf quality from application of coated, controlled release fertilisers has not, as yet, been investigated.

On golf courses where greens or tees are constructed from loam soil there may be such a substantial amount of nitrogen released from organic matter that the annual fertiliser nitrogen requirement is as low as 8 g/m² of N. This would be supplied within two fertiliser dressings. However, the annual rate should normally be between 12 and 16 g/m² of N. An ammonium sulphate-based fertiliser programme is appropriate and any excessive acidity produced can be counteracted by applying top dressing materials with a neutral pH value.

Phosphate

Many golf greens contain more than adequate concentrations of soil phosphate for fine turf as a result of the application of phosphate fertilisers regularly over many years. Chemical analysis of the soil will show whether or not this is the case. Many of the newer, free-draining sandy rootzones do not contain such high phosphate concentrations and where soil tests indicate very low amounts, a phosphate fertiliser should be applied to prevent deficiency. An application of around 2 g/m² (as phosphorus pentoxide) can be applied in spring within a mini-granular fertiliser. Alternatively straight super phosphate can be applied at 10 g/m². Such application rates will prevent deficiency without causing an excessive accumulation of phosphate in the rootzone. The presence of a low soil phosphate concentration should not be ignored as it may lead to severe die-

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Containing two modern powerful herbicides, Bastion T* provides versatile and reliable performance with a high level of safety to turf grasses. Bastion T* is approved for use on young turf, providing early protection to juvenile swards.

With performance and turf safety confirmed in STRI trials, Bastion T* is the powerful new answer to problem weeds.
Facts about FERTILISER

Potassium
Potassium is known to aid in the drought tolerance of turfgrasses and there is also some evidence that it aids disease resistance. Again, it is sensible to ensure that there is an adequate concentration in the rootzone. If there is a requirement for potassium then between 6 to 15 g/m² (as potassium oxide) should be applied in a year. The higher end of the range is applicable for very sandy rootzones and this is divided into three dressings each of 5 g/m² of potassium oxide. For loam soils a single dressing in the spring of 6 g/m² of potassium oxide would be adequate. The potassium can be provided from micro-granular turf fertilisers or as straight potassium sulphate.

Magnesium and micronutrients
Only on very high sand content rootzones is there any need to be concerned about the levels of magnesium and micronutrients available to the turf. Even here, visible symptoms of deficiency are not commonly encountered. However, it is possible that very low plant concentrations of magnesium or micronutrients will lead to some impairment in growth. At present there is simply not enough information on this. Therefore, where rootzone chemical analysis reveals low concentrations of magnesium or micronutrients it is a sensible precaution in the spring to apply a magnesium or micronutrient (trace element) containing fertiliser. Many proprietary fertiliser products now contain magnesium and an annual application equivalent to 2 g/m² of magnesium oxide will be adequate. Alternatively Kieserite applied at 7 g/m² or Epsom salts at 12 g/m² will supply sufficient magnesium for the turf.

A number of fine turf fertilisers contain a micronutrient content, but there are also available concentrated micro-nutrient fertilisers for use in horticulture and agriculture. Advice should be sought before using such products on fine turf.

Fertiliser products
There are many new fertiliser products coming onto the market – liquids, microgranules, organics and slow release. It is often difficult, from the label, to know what is actually in the bag or container and what their long-term effect on the turf will be. If there is any uncertainty then get in touch with STRI.

The author, David Lawson, B.Sc. Ph.D., is a soil chemist with the STRI.
Supertox 30 dismisses over 22 different turf weeds

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