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Using wetting agents for dry patch control

A review on the use of wetting agents by Neil A. Baldwin, plant pathologist, at the Sports Turf Research Institute in Bingley

Many greenkeepers are familiar with dry patch, a water-repellent condition of fine turf prevalent especially on links courses, however, this condition is also found on heathland and parkland courses. The symptoms of dry patch may be alleviated to a certain extent by applying wetting agents regularly through the growing season to aid penetration of water into affected turf. This article describes the wetting agents currently available and how to apply them effectively for dry patch control.

Wetting agents are essentially mild detergents which are designed to increase the infiltration rate of water into hydrophobic (water repellent) turf. Basically, they achieve this in two ways. Firstly, when water droplets come into contact with a hydrophobic turf surface they 'ball' up to form a large contact angle (Figure 1). If a wetting agent is added to the irrigation water then surface tension is reduced, a smaller contact angle is formed and consequently the water spreads over a greater surface area, thereby wetting more of the turf (Figure 2).

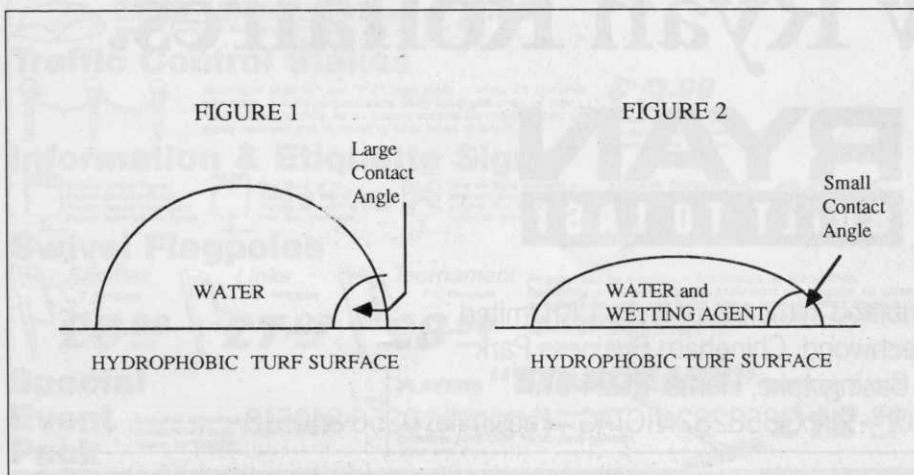
Secondly, the wetting agent, once it has entered the turf profile, can then bind to the organic materials shown to be responsible for creating the hydrophobic nature of dry patch areas. During subsequent irrigation and rainfall, wetting agents in the turf will re-dissolve to produce essentially the water-attractive turf surface originally created. Thus,



Irregular ring of dry patch affected turf (brown area) surrounding healthy turf (central green area).



Irrigation applied 3 hours before photograph was taken. Note water repellency of dry patch affected turf.



regular applications of wetting agents (as recommended by the manufacturers) will lead to an accumulation of chemical thus enabling water to penetrate more freely.

In the 1950's a mild detergent namely Teepol was commonly used on turf to aid water infiltration. Teepol is an **anionic** chemical which means that it has a strong negative electrical charge. Problems occur when anionic materials are applied to turf as they can, with frequent application, have an adverse effect on soil structure especially on soils with high clay contents. **Non ionic**

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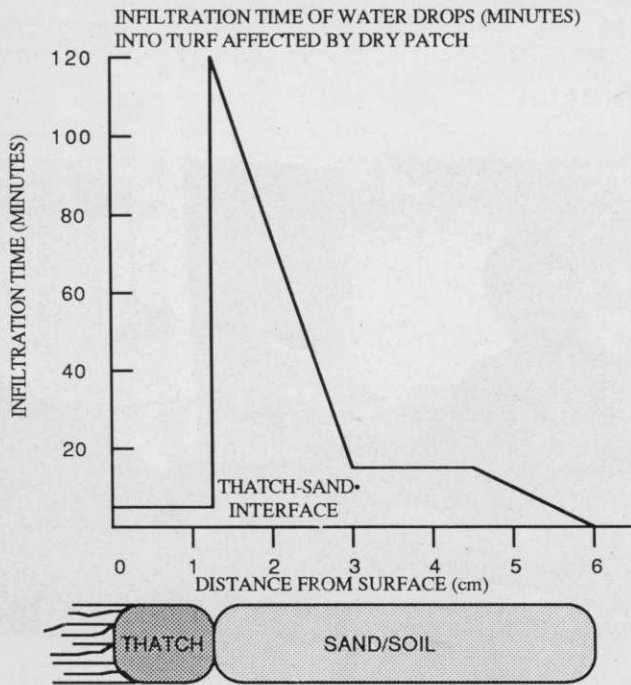


Figure 3. Just below the thatch layer is where the turf is most hydrophobic. Spreadable wetting agent formulations can be placed in this zone after hollow tining or Verti-Draining.

chemicals (which have a very small electrical charge only) do not affect soil structure and consequently may be used safely. For this reason most commercially available wetting agents are non-ionic forms.

Field trials at STRI and feedback from golf greenkeepers has enabled recommendations to be made on the timing of wetting agent applications for the alleviation of dry patch.

Generally, wetting agent applications should begin at the start of the growing season, before dry

patch is observed. If dry patch is a problem, then much can be gained from the routine applications through the April to October period, spraying the chemical at four to six week intervals. This should be combined with aeration using slit or chisel tines to aid turf penetration. In situations where dry patch is a major problem or where preventative applications have not been made, then treatment has to be more intense, and wetting agent applied every two to four weeks and forced into the turf by hand watering. However, it is extremely difficult to

obtain satisfactory results by making curative applications, emphasising the importance of a strategy based on prevention rather than cure.

To date, there has been little research comparing the relative effectiveness of the various wetting agents currently available. Research in the USA has identified Aqua-gro as being readily absorbed on to hydrophobic materials in turf which may produce lasting effects against dry patch. It is probable that Hydro-wet has similar properties. Also, Synperonic has for many years been recommended as a cost-effective wetting agent treatment. Recent research at STRI has developed, in collaboration with industry, a new wetting agent, namely Turfex, which has excellent penetrative properties into water repellent turf.

Spreadable formulations of Aqua-gro and Hydro-wet are also available. Spreadable wetting agents consist of the chemical together with a dry carrier, such as ground corn cobs, which can be easily spread on to large turf areas. These spreadable formulations can also be worked down hollow tine or Verti-Drain holes, placing the wetting agent where the turf is most hydrophobic - often just beneath the thatch layer (Figure 3). Even with extensive watering, this is often extremely difficult to achieve with liquid formulations.

Further information on dry patch and the use of wetting agents may be found in the following publications: Anon (1987) Dry Patch. *Sport Turf Bulletin* 159, 11-12. Baldwin, N.A. (1987) *Turfgrass Diseases*. Sports Turf Research Institute, 40pp, price £2.50.



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Always ahead of the game

Iron and sand keeps fusarium under control at Tudor Park

John Lelean meets the helmsman, on course for a successful season.

On the outskirts of Maidstone near the village of Bearsted, the new Tudor Park Hotel Golf and Country Club fits majestically into the rural Kentish countryside.

Built on the site of the Tudor House Restaurant, gutted by fire some years ago, together with the adjacent former deer park of Milgate Estate, Country Club Hotels, a division of the Whitbread Group, have created the first of a new generation of hotel golf and country clubs, which they justly regard as the flagship of the present ten similar hotels and golf courses operated by the company.

But more about the superb hotel and leisure facilities later. The objective of my visit was to meet the man responsible for the upkeep of the eighteen hole Tudor Park Golf Course, course manager Derek Keen.

Derek is well known to many greenkeepers in the Midlands, having moved to Tudor Park from Telford Golf and Country Club to take charge at the construction stage in 1985.

Prior to his appointment at Telford in 1974 he had a four year stint as head greenkeeper at Shrewsbury where a new course was built to replace the original 1891 design.

He has always taken an active part in the affairs of the Greenkeepers Association and was one time secretary of the Midlands Section, always to be relied on to produce newsworthy items for publication.

His interest in the advancement of greenkeepers is still strong, though Derek now confesses to taking a less demanding role in the organisation, understandably because of the responsibilities he has undertaken with his new course, though he has accepted a committee position for the Kent Section.

The parkland course, designed by Donald Steel was never intended to be a champion-

ship course. Acreage restrictions demanded the 6,041 yards from the back tees had to be set into the land available, but nevertheless Steel achieved his objective to produce a pleasant hotel club course which gives every golfer, regardless of handicap a more than fair chance to beat the standard scratch.

The course winding round the rear of the hotel has two par fives, 12 par fours and four par threes. Two ponds at the fourth and tenth add a feature to the course, but unless one over clubs at the 177 yard tenth, they do not come into play.

There are only 26 bunkers on the course, one way to cut back on maintenance costs, but these are made up by an increasing use of moundings and grass hollows, formed in such a way they can be cut mechanically. The greens in January were in superb condition. Firm with a good grass covering, well drained and hardly a suspicion of poa.

Derek said they were constructed with a herringbone drainage system overlaid with a blinding layer of pea gravel on a gravel carpet. The growing medium is a 70:30 mix of Leighton Buzzard Sand and Fen Soil.

All the greens were seeded rather than turfed with a mixture of Chewings Fescue and Browntop Bent and since the course was opened for play in May last year he estimates there has been less than 2 per cent incursion from other species.

This has been achieved by a programme of intensive cultivation, slitting every two weeks (though this was not too noticeable on the putting surface) and hand cutting with Ransomes Auto Certes. He is cutting every two weeks throughout the winter.

Over the last few months careful use of iron and sand as a greens top dressing has kept the dreaded fusarium at bay and he has had no need to apply any fungicides. Earlier he fertilised with small quantities Farmura and Seamac but now only applies a dilute solution

on weak areas of the fairways.

The fairways, like most courses constructed on open parkland are inclined to be sparse in the initial stages. Derek is attempting to overcome the problem by regular slitting and keeping traffic away from areas with a tendency to wear thin or become muddy, though drainage is not a serious difficulty as the underlying layer is Kentish ragstone a material which has fissures and cracks allowing water to run through.

With hindsight, the tees could have been built larger and some may have to be extended to give greenstaff the opportunity to effect repairs if the number of rounds of golf increase. Winter golf is played off mats and Derek invested around £1,600 to put an artificial surface on every tee, but even these have not saved the immediate surrounds from intensive wear.

The opening of the course at Tudor Park created an interesting situation, which new golf course owners might consider. Although guests at the hotel may use the course as part of the daily tariff, a club was formed to include membership of both the golf course and the leisure facilities, including the indoor swimming pool.

Because it was a new course, the majority of applications came from nearby residents, who previously had not been able to obtain membership of a golf club with the result that quite a number were beginners at the game.

The thought of three hundred 'hackers' let loose on a new course is enough to turn a greenkeeper's legs to jelly, but this was overcome by insisting that golfers had to reach a required standard before they were allowed out on the fairways.

Although this was an added bonus for club professional Marc Boggia, Derek Keen has said the policy has worked well and not only are the new members reasonably

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competent, despite high handicaps, but they have been taught the etiquette of the game. Divots are replaced, pitchmarks repaired, there are less hold-ups and cards are marked correctly.

When the course was planned, trees played a major part in the layout, that was until the hurricane of 1987 struck the South of England. Between 50 and 60 were lost, including ten mature specimens intended to be a feature in the playing of a hole. However these were cleared and in time others will take their place.

Even now visitors to Kent and Surrey are shocked at the total devastation of woodland in the countryside, which will take years to cut and clear, let alone replant.

Derek's pride and joy at Tudor Park is his greenkeeping 'shed'. Shed is hardly the word to describe the magnificent long low L shaped equipment area, hard surfaced in front of the high security up and over doors, with a roofed open area to the left of the building where he is able to store sand and compost and do his own mixing.

The maintenance building includes Derek's office, which also houses the computerized control centre for the Watermation irrigation system and a rest area for the seven greenkeeping staff.

Most of the equipment is Ransomes. In addition to the five Auto Certes for the greens, there are three hand operated Marquis for tees and approaches, three Ransomes 180s, one five blade and two seven blade.

For the fairways he has a Hydraulic 5, with a five gang Magna and a three gang Magna for rough cutting. Power is provided with a 45hp Kubota, a Massey Ferguson 135 and a Ford Tractor with a loader.

For fairway slitting he uses a SISIS TDF 32 and for greens maintenance a Cushman system. Extra equipment includes a screen and shredder and a couple of 36" Bobcats for awkward rough areas.

But to return to the hotel and leisure complex. Derek Keen met me in the poolside grill and bar alongside one of the best private heated indoor swimming pools in the country. The pity was we did not

have the time to enjoy it!

Nor the saunas, jacuzzi, squash courts and snooker tables, though I can sing the praises of the hotel's Garden Restaurant where the food was of excellent quality, beautifully presented by the staff, who perfectly blended the balance between professionalism and friendliness.

As for breakfast . . . that was a treat that had most of the guests gasping for breath as they were confronted with the vast range of tempting dishes from oriental fruits, several types of fish to good old English bacon and eggs accompanied by as many of the extras one could put on the plate.

All the bedrooms have their own bathrooms, most look out over the golf course.

In time the views will be even better as Derek Keen's responsibility includes the hotel gardens. He said the company policy is to create colour and interest throughout the year by planting banks of flowering shrubs.

In his words it is "to create a visual experience", a task I know he will enjoy.

Grass growth on small tees

The Setting: The small but scenic 16th tee at Secluded Woods Golf Club. Dappled light flickers on the teeing ground through the tall oaks. After several practice swings and a few divots, the golfers prepare to play. **The Comment:** "Why can't we grow grass on this tee!" James Snow gives some answers.

Only a lucky few golf course managers have never had to answer this question. Most

speakers of their problem tees with a hint of frustration and forced resignation, feeling that the ultimate solution to improving them would not be acceptable to the golfers. While this may be true in certain instances, it is often possible to make adjustments to the tee itself or to the surrounding environment so that acceptable turf can be maintained.

Problem tees usually suffer from one or more of the following maladies:

- small size
- tree effects
- poor construction
- insufficient maintenance and management

Most often a combination and interaction of three or four of these factors leads to turf failure, but it is probably safe to say most problem tees have one thing in common: they are simply too small to accommodate the play they must take. To a certain point, adequate tee size can compensate for almost any other weakness. The ability to distribute wear over a large enough area is the key.

A good rule suggests that there should be at least 100 square feet of usable teeing area for every 1,000

rounds of golf played annually, with 200 square feet available for every 1,000 rounds played from tees where irons are used. If this was the situation at most golf courses, there would most certainly be fewer problem tees.

Many tees were not small to begin with, but rather, they evolved over

Old tees can't handle the same traffic as modern tees

the years. Consider the great architects of the 1920s building golf courses to accommodate perhaps 5,000 to 10,000 rounds. Had they only known that today their courses are being stampeded by up to 40,000 to 50,000 golfers each year. Construction specifications, too, were not what they are today. Old tees built of native soils can't handle the same amount of traffic as a tee constructed to modern specifications.

Finally, the growing environment around many tees has changed over



A small tee before and after trees were removed.

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the years. The negative effects of maturing trees and the demands for more closely cut turf have pushed tees beyond their limits without intensifying maintenance practices. When this occurs, most golf clubs would be best advised to rebuild or enlarge their tees to better accommodate the traffic they receive.

A major complicating factor contributing to problem tees is the effect of nearby trees. While most golfers consider the shade and aesthetic beauty of these trees, from a turf standpoint they are a nuisance. Shaded turf is inevitably weaker, less vigorous, more prone to traffic injury, and less able to recover quickly from damage. Too many trees block air circulation, leading to problems with heat and disease.

Wherever possible, nearby trees should be selectively culled, and branches on remaining trees should be pruned and thinned to increase sunlight and increase air circulation. If it is done carefully, the turf can be significantly improved without harming the aesthetic appeal of the area.

While it is easy enough to see how shade affects turf, tree roots are the hidden menace. Contrary to popular opinion, tree roots can extend well beyond the dripline in their search for moisture and nutrients, robbing the turf of essential elements. In most instances, root pruning around the outside of the tee can make a dramatic difference in the condition of the turf on the tee. Tree root pruning is easily done by slicing or digging a two- to three-inch-deep trench between the tee and trees. If a trench is used, place tar paper or sheets of heavy plastic along the wall of the trench and backfill. Root pruning may have to be repeated every three to five years, depending on the species and their proximity to the tee.

Trees also affect tees by effectively making them smaller. As trees planted off the front and sides of tees become larger, they block part of the tee. As a result, the actual usable teeing area is reduced, and the remaining surface is subjected to greater and greater play. Where this has occurred, trees should be removed or branches should be pruned back to help reclaim the entire surface.

Many problem tees were unknowingly built to self-destruct. While it is common for new greens to be built to the latest improved specifications, such is not the case with many new tees. The use of pond dredgings or on-site topsoil, the lack of adequate drainage, and poor grading are among the common mistakes.

Where substantial quantities of fill are used, the material is not always compacted or allowed to settle adequately before the topmix is added and the finishing work is done. As a result, settling occurs later and the tee becomes uneven. When this happens, the usable area on the tee is reduced, and the remaining level areas are subjected to heavier play than anticipated.

New tee construction should receive the same kind of consideration as if it were for a green, especially where heavy play is anticipated.

Where time and resources are available, intensifying maintenance practices can partially overcome the effects of small size, poor construction, and tree competition on problem tees.

Any practice that improves the



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health and vigor of the turf is certainly helpful on problem tees. One of the easiest and yet most overlooked programmes is turf fertilisation. Tees frequently require twice as much nitrogen fertiliser as greens, yet they often receive less than greens. Because of heavy wear and their need to recover quickly from damage, use of 3/4 to one pound of nitrogen per 1,000 square feet per growing month is common.

To help overcome the effects of heavy traffic and soil compaction, aerify (core cultivate) problem tees as often as possible. If the soil is poor, remove the cores and incorporate good quality topdressing into the holes, then overseed the tee with the appropriate type of grass, which in the case of problem tees is often perennial ryegrass. Ryegrass germinates and develops quickly, is wear tolerant, and it survives on shaded, compacted tees better than bentgrass.

One of the best techniques for encouraging quick recovery of damaged areas is to fill divot scars daily, weekly, or as often as possible

with a mixture of top-dressing and seed. This helps to keep the tee surface smoothed and helps minimise the establishment of certain weeds.

Because mowing problem tees with triplex mowers can contribute to soil compaction and turfgrass wear problems, try to use walk-behind units. If this can't be done, then request that the triplex mower make its turns off the teeing surface itself.

In the realm of tee management, many things can be done to maximise usable teeing area and to take advantage of every available square foot of space. Depressions should be selectively topdressed on a regular basis until they conform with adjacent turf. Severe undulations or settling over irrigation lines may require that the sod be lifted, the subsurface levelled and the sod replaced.

Trees which interfere with play or block the use of part of a tee should be removed or pruned back so that golfers can legitimately use the entire surface.

Where the situation presents

itself, build ladies tees (or forward tees) to take a certain amount of traffic off the regular tee and to open up a new area for the regular markers where the forward markers had previously been placed. The construction of alternate tees at a different distance or angle would serve a similar purpose.

Careful movement of tee markers from day to day can also be very helpful in distributing traffic over the entire usable area. Using just 1/3 or 1/2 the width of the tee when possible, move the markers in a set rotation so the golfers are forced to use the entire tee over a period.

Dealing successfully with problem tees involves intensifying maintenance and management practices and minimising the effects of nearby trees. When this does not resolve the problem satisfactorily, enlarging or rebuilding the tee to good specifications is the only alternative.

James T. Snow is Director of the North Eastern Region of the USGA Green Section.

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