Ken Barber puts thatch under the microscope and comes up with some ideas to minimise its effects.

Thatch accumulation is one of the most common turf related problems experienced by today’s Course Managers, yet this is not something new. However, because of the ever increasing demands placed on golf courses throughout the year, effective thatch management is essential. Without this, there is a point whereby the long term quality of greens suffer, especially if committees within a club demand that management programmes such as hollow coring or top-dressing greens are carried out early spring or late autumn when the benefits are minimal.

The hard facts are - if thatch is not correctly managed, clubs can expect to play on temporary greens at some point during the winter, and not just because they are covered in frost, but because they retain excessive moisture and are more suited to growing rice than turf!

Thatch is more often the result of poor turf management than a problem that must be managed. If thatch levels are allowed to get out of control, putting surfaces can quickly deteriorate. Members then demand to know why they have to play on temporary greens most or part of the winter. Then at the first signs of summer, the greens turn brown, usually as a result of dry-patch, and the irrigation is turned on to keep them alive. This ineffectual form of management only increases expenditure and will certainly not decrease thatch.

Methods of controlling thatch will vary from one Head Greenkeeper to the next and this is not just dependent on the structure of the greens. However, it is important to have a clear understanding of the basic components of thatch - what causes it, the effects on turf health and vigour as well as methods of control.

What is thatch? Thatch is the accumulation of organic residuals, consisting of, and intermingled with, dead, living or partly decomposed roots, stems and shoots, which develop between the soil surface and the actively growing green vegetation. Thatch only becomes a problem when its density causes grass plants to grow on top of the thatch layer rather than on the soil surface.

What is mat? Thatch intermingled with mineral matter, usually as a result of topdressing. Around six millimetres of mat is advantageous as it promotes weed free, drought tolerant, free draining turf, which provides a cushion against the daily wear and tear caused by golf and maintenance traffic.

What causes excessive thatch? Thatch increases when the rate of shoot production exceeds the rate of decomposition.

There are several influential factors which will contribute or accelerate an increase in thatch levels and consequently management practices will vary from club to club, depending on resources, cultural practices and, ultimately, the knowledge and experience of the Head Greenkeeper. One or several of these factors may be linked i.e. soil characteristics, grass species, soil pH, fertility input, irrigation practices, even microbial populations.

The characteristics of a soil will, no doubt, have some influence. For example high percent sand greens, by
their very nature have low CEC (cation exchange capacity), and more often than not, low microbial popula-
tions essential in thatch decomposition. However, the bene-
fits may compensate for the negatives with this method of construction, which is being favoured more and
more throughout Europe. The operating costs of high percentage sand
greens may be a little higher, but if built correctly and sound manage-
ment practices are implemented, those costs can be redeemed through
a full contented membership and maximising premium green-fee rates as
the greens are free draining and playable throughout the winter.

Soil greens retain nutrients longer, generally have higher CEC and
and microbial counts, but are still vulner-
able to thatch accumulation, although this is more likely as a result of
compaction, reduced oxygen supply to the roots, or excessive fertility input.

The type of grass species and culti-
vars will effect a management regime,
basically based upon the growth habit and aggressiveness of the desirable grass species. Bents, in particular the creep-
ing bents, have a vigorous growth habit and the new varieties of creep-
ing bent such as A-4 or G-6 are reputed to be so aggressive they out-
compete annual meadow grass.

At the other end of the scale there are the less aggressive growing species, such as the fine fescues, which can produce significant thatch layers due to their leaves, nodes and crowns being extremely resistant (high lignin content) to decomposi-
tion. Although, with fine fescues, thatch levels take longer to accumu-
late than other more vigorous growing grass species, their recovery rate is slow and therefore any mechanical de-thatching operation
should be less severe than with other
strings.

The soil pH can have an adverse effect on thatch development and as the pH decreases thatch is likely to
increase - this is primarily due to acid soils having a negative effect on
microbial populations, thus reducing the potential for decomposition. Once thatch becomes hydrophobic it can reduce pesticide efficiency by inhibiting penetra-
tion or causing runoff.

Thatch will harbour many types of disease pathogens, waiting for envi-
ronmental conditions suited to their active growth. They survive as rest-
ing structures or as saprophytes (organisms which live on dead organ-
ic matter) in thatch. For example, turf grass pathogens thatch provides the
perfect moist environment, but some say that most turf grass pathogens are
air-bored and therefore thatch cannot thus inhibit that disease inci-
dence. However, evidence proves that excessive thatch reduces turf grass
health and vigour and therefore must surely increase disease incidence.

The prevention of excessive thatch is
managed by cultural practices through either mechanical or biologi-
cal means. Biological control is linked to main-
taining a healthy environment in order for micro-organisms to decom-
pose thatch. It is important to remember that thatch accumulates over a period of time and the more vigorous species such as bent grass may produce excessive thatch in just two or three growing seasons. So from the early days of establishment, it is important to understand the growth
habit of the grasses you are manag-
ing, as this will dictate the kind of
management regime you implement.

If you identify a thatch related prob-
lem, then it is advisable not to attempt eradication of the problem in one season, but to programme a series of operations over a period of one or two years, ensuring that any operation is carried out when environmental con-
ditions favour thatch removal i.e. grasses are actively growing, thatch is
moist and temperatures are adequate to promote active growth and a rapid recovery.

As previously mentioned, thatch can be produced through various
physical or environmental conditions, and the resulting characteristics of the
thatch can alter from soft and hold-
ing water, like a sponge, to dense and tightly bound, preventing moisture
penetration. Totally different manage-
ment practices may then be required.

However, increasing the oxygen to the soil environment will go a long
way towards solving the problem. Fifty percent of thatch related prob-
lems could be resolved simply through aeration. Unfortunately however, the
more disruptive the form of aeration, the better the results.

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quickest and most beneficial way in which to reduce excessive thatch, as this not only physically removes
organic matter, but permits gas exchange, vital in maintaining a healthy microbial environment neces-
sary in thatch decomposition. It.

Right: A change in the manage-
ment regime can be clearly seen with recent hollow coring and top-dressing. Note the new white roots growing beyond the tine hole.

Below: Hollow coring a green with one of the many serating machines which simplify this important task.

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also assists with the movement of pesticides, nutrients and water through to the soil layer - how many times have you seen healthy white roots growing in tine holes or slits? Because hollow coring is disruptive to putting surfaces and subsequently upsetting to golfers, we tend to restrict this operation to one or two occasions per year. However, although not quite as effective, there are other forms of aeration which can also be beneficial in thatch reduction. These include the use of solid, chisel and slit tines, designed more to relieve compaction and permit air and water movement than physically remove thatch. Slit tines (thin bladed knives) can be used on a regular basis, not only for the benefits already mentioned, but also pruning tillers, yet causing minimal surface disruption.

Consideration for the long term quality and condition of the golf course must always come first, and this means course maintenance programmes should not be dictated by club competitions - ideally the reverse should happen. Hollow coring greens at the end of March or October will be far less beneficial in reducing thatch and recovery time will be slow, rather than when actively growing in April, May or September (this will naturally vary according to the part of the country you are working).

If well informed and given the choice, it is likely that members would rather have two weeks of disruption during the growing season than two months or so of playing competitions on temporary greens during the winter. Communication to members/visitors via the club diary and noticeboard that, subject to weather, the greens are to be hollow tined during the first week of May and the last week of September (earlier in the north of the country) then competitions and society bookings can be planned accordingly - "To be pre-warned, is to be prepared."

Top-dressing greens, either as a separate programme or in conjunction with a coring programme, will dilute thatch and assist in producing an environment more conducive to plant growth. The number of occasions greens are top-dressed is dependent on the growth habit of your particular grasses. Assuming that the underlying soils are of the desired specification, it is important that the top-dressing material is compatible (similar size and composition) with the root zone to avoid layering.

Irrigation management is reliant on the ability of water movement from the surface through to the root zone effectively and for moisture to be retained in the macro and micro-pore spaces. Irrigate when there is least wind, preferably early morning. The aim should be to wet the soils without exceeding infiltration and percolation rates. Research shows that roots do not "go in search of water." However, roots only grow in moist soil and continually grow into new areas that have not yet dried out. So, in practice, this means that if only the upper layers of the root zone remain moist, roots will be confined to these areas. If, by probing into the soil, it is revealed that the soil is dry a few centimetres below the surface, this will largely be due to root uptake and the root system will continue to shrink as it removes the moisture. By assessing the moisture content within the first 15 - 20 centimetres of the soil profile using a soil probe, will ensure adequate moisture for healthy root development.

Fertility regimes will vary from course to course and will be dependent on the Head Greenkeeper's ideals and philosophies. However, it is important to avoid excessive applications of nitrogen and monitor nutrient availability and pH reading via soil tests.

Controlling thatch is essential to maintaining healthy turf and problems relating to thatch accumulation can be avoided if sound management programmes are implemented - REMEMBER - Be pro-active rather than re-active and "don't let the thatch grow beneath your feet."

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