

Too fine by half

Jim Arthur BSc investigates the use of fine sand in top dressing



Although creating less criticism than the feed and water philosophy in greenkeeping there is one feature of modern agronomy that has potentially more damaging repercussions.

This is the use of very fine particled top dressing and root zones tending to replace the ideal specification summarised and perhaps oversimplified as 80% between 0.25 and 0.75 mm. In many of the mixes that I criticise there is virtually nothing larger than 0.25 mm, just a fine silt.

The problem with the supply of such ideal coarser particled mixes is that larger particled sands especially are getting scarcer and more expensive. This is partly due to reduced supply and partly to increased demands from other better heeled organisations, notably filtration plant manufacturers.

Sources of the correct sand cost significantly more and in these days of cost being sadly the sole deciding factor, very fine sands are used, even where extra carriage costs reduce their competitiveness.

Let me stress that this is not an academic nor solely a traditional factor. It is essentially both a scientific and a practical one, both with top dressing and in root zones used in constructions.

Significantly it affects the specifications for both perched water table greens (of which the much quoted and dare one say, Green Section specification, is only one).

The principle of perched or suspended water table greens depends on achieving a physical balance between moisture retention and free drainage.

Sand-only, i.e. 100% sand greens - a heresy of short life aimed at achieving free drainage under high irrigation in hot arid climatic conditions - have no water retention (to cope with such excessive levels of irrigation) and are emphatically not perched water table greens.

The finer the particles the greater their surface tension and the more their moisture retention levels and vice versa. To balance this out a specific relationship between particle size and depth of root zone is needed over the stone or gravel drainage layer to achieve a head of water.

If there is insufficient head, the water will not jump the gap and



Mixing on site should never occur.

remorselessly builds up in the root zone, with virtually none reaching the drains.

The end result is hole cups full of water and soft squelchy waterlogged greens.

The only solution is not aeration - the holes merely close in after a short time - but lies in increasing the depth of root zone. In one well documented case which cost the architect and the agronomist £1 million each the greens had to be rebuilt.

The tees, built up with the same very fine sandy root zone, drained perfectly as they were built up 2-3 feet in depth, so the head was sufficient to force the water through.

This is such elementary junior soil physics that it astounded us as to why such a simple error could not have been recognised in the specification. In passing, matters were not improved by the contractor skimping on the already inadequate specification for the root zone depth.

The financial deduction is that it is a false economy using a finer but slightly cheaper sand because a significant extra depth is required and not just the odd inch either which more than eliminates any saving.

What is hard to understand is the current agronomic vogue of using such fine sands, often carted for hundreds of miles, from e.g. Cheshire, to sites a relatively short distance from Bedfordshire pits. Yes, it costs a few quid a tonne more, but this is often equalled by extra haulage, let alone greater depths being needed. If there is a reason will someone please tell me?

Another problem with root zones is that there is a fashion for mixing inadequate volumes of organic matter with the sand giving an 80:20



Mixing root zone of fen soil and sand is best done centrally, off site.

proportion, instead of in my book 70:30 and in a recent construction which I specified and supervised 60:40, using fen soil at 40% so as to match the existing greens. The end result was a new green built in days not weeks in late October and in full play from the start of May.

The type of organic matter is just as important as the quantity. Many agronomists would agree with me that the ideal mix is fen soil with Leighton Buzzard or equivalent sand with virtually all the particle size range between 0.25 mm and 1 mm and certainly very low 'fines' (fine sand, silt and clay).

Yet a minority insist on using peat. Even finely mulled moist peat cannot provide a homogenous mix with sand, or only with great difficulty and normal bulk peat on the dry side never will.

Furthermore the subsequent and all important top dressing should be the same as the root zone and sand-peat mixes quickly separate out and the peat element largely blows or washes away or is collected by the mowers.

Fen soil, in passing, is a geological not a trade term, the product from the re-establishment of water features on drained fenland derived from opening up as water features wetlands for conservation reasons.

Why when we have sufficient supplies of the ideal materials for root zones and top dressings to meet all current needs do we use poorer products - just because it is slightly cheaper but vastly inferior. Note that fen soil is not technically a peat but an ideal and not too rich (fertile) source of essentially needed humus (organic matter) capable of being finely screened.

Properly constructed perched water table greens with the right specification have lasted for 40 years. The USGA Green Section started their green specification in 1960 but it has been so modified over the years to be virtually unrecognisable, but still if not excessively modified it still works well.

My specification, which started quite independently in the mid 60s, differed fundamentally mainly in the drainage carpet - of much larger stone as opposed to fairly fine gravel, primarily to achieve stability on our softer soils.

With stone you can run a long jibbed swing excavator on to the centre and leave it there to spread successive layers of blinding and root zone. This is not easily possible with pea gravel. Ever run your car over a 4" layer of gravel on your drive? All you get is ruts and disturbance! The problem in some countries is that there is no natural stone, but plenty of gravel. This smacks of improvisation, not principle!

Even where no green construction is involved, the veto on very fine



A blinding layer being spread by a long jibbed excavator.

soil/sand mixes for top dressing is just as important, as super fine (ie <0.25 mm) particle size material. It may well be easy to apply and work in with minimum disturbance to play, but it seals and impedes surface drainage. Agronomically, it is far better to use coarser ie >.25 mm even up to 1 mm than finer material even though there is slightly more disturbance to putting surfaces.

Greens etc. so treated, drain better and are firmer and above all perform better in winter. The cost of minimising disturbance to putting surfaces in the growing season is far greater than disturbance from aeration to try to improve drainage.

One can understand commercial sources lacking access to pits with coarser sand eulogising in the way golfers approve, but it does not alter principles.

Why choose inferior finer mixes with the wrong performance characteristic by buying, as too many do, primarily on price. The end result is often vastly expensive and often avoidable reconstruction and, in this day and age, there is less and less money to pay these unnecessary bills.

It is gratifying to note the enormous swing towards traditional golf; in Denmark especially, and chastening to think that their much criticised prohibitive EU fungicide regulations have forced greenkeeping to adopt austere measures to avoid fungal disease against which they (and soon we will) have no defences.

Many Danish courses have already started going back to fine fescue dominance and many more are following sound practices, under the inspired leadership of Chris Haskell.

The feed and water Poa annua school represent a high cost policy dependent on fungicides. Without the latter, as has been seen in Germany and elsewhere, greens can be totally destroyed.

It seems that quite inadvertently the 'Greens' have influenced and justified sound greenkeeping for the better. We must now attack the other basic faults - excessively too fine sand/soil mixes for root zone and top dressing.

Far too many heresies are promulgated because the correct materials are difficult to find or slightly more expensive. After a while, but often not before the resultant problems are all too evident, it becomes a trademark and such malpractice's are enshrined by being incorporated in prestigious developments.

Then we wonder when we see reconstruction on an heroic scale to correct basic errors which should have been obvious to agronomists and constructors if not sadly to architects, developers or owners.

Why can some people not leave well alone? If it isn't broke don't try and fix it. All the basic principles are constantly attacked often for blatant commercial reasons, yet they do work, give better results and cost so much less.



Author Jim Arthur (right) oversees the spreading of root zone over a blinding layer of Cornish grit.