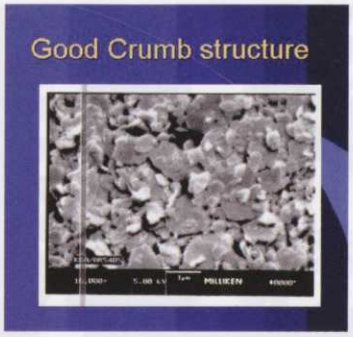

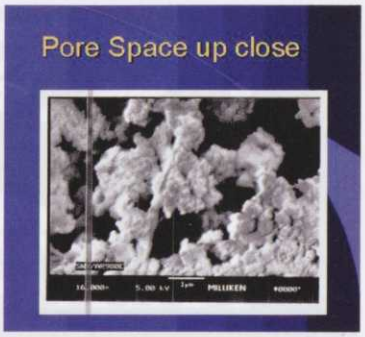

Aeration: Don't let compaction get you down!

"The goal of every turf manager is to produce a healthy, dense sward sustained and supported by a vigorous root system", says Richard Fry...

A good soil should provide the ideal environment for achieving this objective but the forces of compaction, unfavourable climatic conditions and the limits as regards to mechanical 'cultivation' all conspire to impact negatively upon this aim.

The key measure of a good soil structure is its ability to maintain adequate quantities of air, water and nutrients, however, it is the crumb structure and its pore space ratio that holds the key to successful soil management. Soil must have the correct balance of macropores for gravitational water movement and air exchange and enough micropores to hold moisture. At the same time, it is vital that there is an unrestricted capillary action for water to be carried to the plant roots. These pores must be maintained against outside impacts, such as compaction and climate extremes to continue to perform effectively.

IDEAL CRUMB STRUCTURE:

- Open macropores down to the subsurface level - Essential for the rapid removal of gravitational water
- Open macropores to assist root penetration - Roots will 'give-up' when faced with compacted layers
- Closed micropores to hold available moisture 'reservoirs' for plant use - Capillary action delivers water to plant roots and soil surface
- Open pores reduce compaction, perched water table and layering - Aereobic conditions increase microbial activity

Unfortunately, due to the lack of macropores that absorb physical impact, the ideal is rarely achieved as foot and equipment traffic constantly compact the soil. At the same time, due to the build up of fines and lack of effective drainage, saturated soil drives out oxygen and restricts air availability to the roots.

Current techniques for providing a remedy for poor drainage and compaction are well established.

Mechanical aeration is a tried and trusted operation that is very effective over a period of time in that it 'opens' the soil to encourage air and water movement. Nevertheless, this practice does not restore the macropore/micropore ratio in the soil and treats just 5-6% of the surface at any one time.

Wetting agents are effective in providing a 'short term fix' as they alter water tension to allow soil particle 'wetting' and assist the movement of water into and through the soil by allowing moisture to 'squeeze' through cracks in the soil. However, they do nothing to cure the compaction problem itself.

COMPLEMENTARY METHODS

Additional methods of providing relief from compaction and poor drainage are the incorporation of soil amendments and the application of polymeric polyelectrolytes.

In the case of soil amendments, the choice is between mined, silica diatoms marketed under a range of brand names or an engineered Profile ceramic granule. Both are highly porous and can be incorporated into the soil surface following hollow, coring or physically 'drilled' into the soil through a technique called 'drill & fill'. The Profile granule is commonly considered as the more stable in the soil and is specially tailored to match USGA particle size distribution.

When incorporated, these amendments physically improve the soil structure by creating artificial macropores that increase water retention, nutrient holding capacity and high CEC ratios.

The use of water soluble, polymeric polyelectrolytes such as Integrate, pioneered in the UK by Rigby Taylor and Greenlink have been very successful in repairing collapsed pore space and restoring aeration and water percolation.

Applied as a conventional high volume spray, the anionically charged polymer ions in Integrate move down through the soil, penetrating compacted layers and solid soil structures.

This action, solubilises clay and organic 'fines' and, together with the catatonically charged, insoluble magnesium and calcium ions, are drawn together into larger particles (agglomerates), repairing and restoring collapsed pore spaces.

This restoration of closed pores and the 'opening up' and creation of new pore spaces will improve crumb structure and the water/air balance in the soil. The available water is now free to move upwards, downwards and across in the repaired pore spaces, pulling in air and transporting nutrients. New root channels are encouraged and a deeper root system developed leading to a more healthy, vigorous turf.

Neither soil amendments or polymeric polyelectrolytes are seen as replacements for mechanical aeration but should be considered as complimentary treatments that can be 'integrated' into the annual maintenance programme.