

Why, when and how?

There are many modern methods of aerating our growing medium. Here, David Snowden of Agronomic Services Ltd, discusses why, when and how to aerate.



Oxy-Rush NG chemical aeration and physical aeration produces a far more efficient root zone.

David Snowden has spent more than 30 years in the sports turf industry, beginning with Lindum Turf, then Floratine Products Group, before establishing Agronomic Services Ltd. He has been fortunate enough to play a role in many prestigious projects, as well as regularly working with Premier League and Champions League football clubs in the UK and Internationally.

Q: David, what are the principal reasons that sports turf professionals aerate their soils or growing medium with different machines and tines?

A: There are many benefits. I will aim to mention the primary reasons, aeration is all about reducing compaction and increasing the

percentage of oxygen to the root zone. The more air in our soils, the more prolific aerobic bacteria will become. As turf managers, there are three basic forms of bacteria, which we are interested in; those which use oxygen to be prolific (aerobic); those which can survive in low or oxygen-rich environments (facultative anaerobes) and those which do not use oxygen (aerobic). These aerobes consume oxygen for cellular respiration, releasing carbon dioxide (CO₂), water and nutrients for roots to use and drink.

We are always striving to create the ideal environment for our sports turf. With this in mind, we need to consider



An example of a black layer problem and why there is a need for chemical and physical aeration.

“Understanding the various forms of aeration and what they actually achieve, whether it’s physical removal and solid tining is crucial.”

The blight of the black layer

As turf professionals, we know that anaerobic soils are not efficient and can result in a condition known as ‘black layer’. Oxygen diffuses more slowly into wet, dense soil. This slow rate of diffusion will drop oxygen levels several per cent in just a few hours. When oxygen soil volume is reduced below 12 to 15 percent, most plants will suffer. Reduced oxygen also modifies the decay process, as well as the oxidation process of soils. As soil oxygen concentrations become limited, anaerobic microbes take over. This shift in microbial populations from aerobic to anaerobic organisms, introduces a new set of soil reactions. Some of the new soil reactions are an increase in partially oxidised organic acids, alcohols, ethylene gas and inorganic compounds. These compounds build and become toxic to plants. Aeration is another method to prevent this.

To sum up, there are multiple benefits to aeration; increasing the efficiency of the root zone, which in turn increases root mass and prevents disease and maintains a strong, healthy plant.

Q: When do we need to aerate our growing medium?

A: In an ideal world, we should aerate throughout the year as frequently as possible. Yet we all know the pressures the professional Groundsmen/women and Greenkeepers are under to maintain a perfect playing surface. Therefore, the modern sports turf manager schedules aeration in order to meet the pressures of play. Whether this is resort golf, where visitors are paying to stay and play or the first team coming out to practice on a perfect pitch, or perhaps a golf tournament? Consequently, the modern sports turf manager has to consider his methods, his timing, his budget and the results achieved.

Q: How do we aerate our soils and what methods are available to deliver this?

what our soils need to create the perfect environment for strong, healthy roots to survive. Cells in the grass plant roots need to get oxygen from the environment to stay alive. Even though roots are buried, they can absorb oxygen from the small air spaces in the soil. Without these root cells, the rest of the plant will die. Therefore, it is critical to aerate our growing medium.

We should remember that plants get approximately 70 to 80 per cent of their required CO₂ from the soil. This can only be achieved in well-aerated soil. Aerobic bacteria out-compete pathogenic bacteria, which will result in less disease pressure.

Additionally, turf grass stress can be reduced by ensuring there is enough air in the soil. The ideal percentage would be 25 per cent air by volume. The roots can grow and a healthy root system leads to a healthy grass plant.

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A: Traditionally there were very limited resources, which were heavy and potentially caused more damage than good.

Understanding the various forms of aeration and what they actually achieve, whether it’s physical removal and solid tining is crucial.

There are wonderful examples of modern engineering, such as the Air2G2 and those turf maintenance solutions offered by companies like GreenTek Solutions Ltd. These include numerous options, like the Dyna-Spiker and Slicer and the Dyna-Corer. Together with these modern practices, we have successfully combined chemical aeration and thatch breakdown, which has the added benefit of providing a free food source for the microbes and therefore the roots to drink.

For a number of years, turf managers have been successfully using a combination spray during the

warmer months, of Oxy-Rush NG and Thatch Buster for. These products “super charge” the aeration process. This has meant managers can control the organic matter and thatch build up



disturbance to the playing surface. Less stress to the turf means less stress for the turf manager!

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- Surface aeration. If you have a tight, dense sward 20-30mm of thatch, then micro coring to the depth of the thatch is a valuable exercise. This allows the turf surface to expand and breathe.
- Barrel rolling, slitting, etc. This allows the sward to breathe, reducing the spread of leaf based pathogens.
- Deeper hollow coring. There is very little point in deep hollow coring and removing material if the growing medium is in good condition.
- If there is black layer evident, organic matter and compaction, the reduction of sulphate and the mineralisation of organic sulphur compounds may cause the formation of hydrogen sulphide. There’s probably an underlining issue with drainage.
- Deep solid tining with some heave at the correct time of year can be very beneficial in increasing soil oxygen.