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The Birth & Ageing of a golf green

When a golf green is constructed using a USGA recommended sand and a small amount of organic matter, normally in this country a Canadian Sphagnum Peat is mixed with the sand, to give the greens mix some water and nutrient holding properties as well as provide food for the microbes. The amount of organic matter/peat that will be blended into the sand to form our greens mix will vary depending on the architect's specifications.

The architects' job is not an easy one. They need to consider the quality of water that will be available for irrigation purposes, the type of turf selected, climate, size of greens, number of rounds played, green speeds desired, aerification budget and many other factors to determine the proper mix of sand and peat that will be ideal to support the turf selected and to provide golfers with the putting surface desired.

Normally the ratios of sand to peat by volume are between a 95/05 and an 80/20 mix. Today however we are seeing more and more greens being constructed with the peat being on the lower end of 5% and an inorganic amendment of around 10% being added to the blend resulting in an 85/05/10 mix of sand, organic, inorganic. Most inorganic products used in our industry will provide additional water holding without sacrificing air pores and will also provide additional CEC [cation exchange capacity]. A cation is described as being the ion in an electrolyzed solution that migrates to the cathode; broadly: a positively charged ion. This ion will attract and hold nutrients that have a negative charge.

The logic behind this thinking is to start the greens with as much in the way of air pores as is possible without making them too droughty. If you will remember in my last article the point was made that roots from our turf can only live in air pores not in solids or water pores [Rooms at the Inn]. With this understanding of the need for oxygen for our turf, it makes sense to start our greens out with as many air pores as possible but still have adequate water and nutrient holding properties. **From the day we seed, sod or sprig [start our grow- in], the amount of air pores in our greens start to decline.**

A green built with a USGA spec'd sand and organic will start its life on average with 55% solids and 45% pore space. The pores will have a distribution of around 30% air and 15% water. At the two year stage of a greens life with what is considered normal twice a year hollow tine aerifying, the greens properties will be 60% solids and 40% pores. The distribution of air and water pores will have done a flip and changed to an on average of 15% air and 25% water. See following chart.

NORMAL AGEING

NEW GREEN	2 TO 3 YEAR OLD GREEN
■ 55% SOLIDS ■ 45% PORES 2/3 AIR PORES 1/3 WATER PORES	■ 60% SOLIDS ■ 40% PORES 1/3 AIR PORES 2/3 WATER PORES

As was mentioned in my 2nd article, [Jan/Feb Boardroom] greens of the **older** turf species require a minimum of 15% in the way of air pores in order for the plant to have an adequate oxygen supply. The **newer** species of Bent and Bermuda grasses require a higher amount of oxygen in the greens mix due to higher turf and root shoot density. The amount of air pores we like to see for the new grasses is a minimum of 18/19% and preferably 20/21%. Our research shows that the new grasses at 20/21% air pores normally do very well and at 15% have a tendency to struggle.

There are many reasons for the loss of air pores. When the sand/organic mix is placed in a greens cavity it is seldom compacted and during grow-in is in a somewhat fluffed condition even after rolling. As the greens mix settles the compaction process starts and the loss of air pores begins. During the grow-in process we will use a large amount of irrigation water and products which adds to the compaction & contamination process. After the turf is established we move the compaction process along even further with the addition of equipment and foot traffic on our greens. Most compaction and loss of air pores is confined to the top 1 to 2 inches of the greens mix.

This compaction and loss of air pores is the reason we aerify.

Next article: "Think Displacement of material not aerifying"

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