

THE IMPORTANCE OF GREENS AERATION

By Bruce Jamieson

After one of the wettest summers on record, combined with the golfer's desire for improved putting surfaces, the need for aeration has increased substantially. Clearly something must give: if aeration is postponed until late autumn, the players may be appeased. However, limited or no recovery will occur during periods of low temperatures, causing frustration for golfers as the greens will take longer to recover.

You can almost hear the cry: "Why can't the head greenkeeper leave the greens alone?" The answer is that, though the need for aeration is extremely difficult to justify when the greens are looking great, if neglected the resulting problems will slowly increase and the greens will start to deteriorate.

But before aerating the greens course managers must decide what needs to be achieved through this disruptive process, as all too often the wrong operation is implemented just because it was done in previous years.



Assessment of the greens will indicate the course of action required. If the problem is compaction, and the rootzones are of a high quality with limited thatch, Verti-draining with a small amount of lift or heave would be the correct approach. This is in preference to hollow coring, which removes a core of material to allow soil improvement. But if the thatch layer has increased during the summer months, as it has on many courses this year, then hollow tining may be the best course of action as it will remove some of the organic build-up and allow new rootzone material to be inserted into the thatch layer. This increases microbial action and helps to break thatch down.

It is important to recognize that aeration replaces cultivation of the soil in its true sense. Farmers will always turn the soil between crops to relieve compaction and redistribute nutrients evenly throughout the profile. Unfortunately, this type of exercise would be too costly and disruptive to the golfing calendar.

However, during the late 50s and early 60s it was commonplace in Scotland for head greenkeepers to remove the turf from two or three greens during the winter and dig the rootzone material over to a depth of 250-300mm. This material was then made firm, by using the heel and tread method, prior to raking and was done at least three times to ensure the material was evenly consolidated.

Surface levels may have also been adjusted or amended at this point. The turf was placed upside down in a box and the thatch and soil was

cut away to ensure that all of the turves were of a uniform thickness, following which the greens were then re-laid and top-dressed.

Some head greenkeepers apparently were able to boast that three greens could be done each winter without the members realising! However the volume of play was probably not as great then as it is now and certainly members today would not accept this type of disruption. This kind of operation was implemented before the advent of hollow tine and aeration machines. Things have moved on, thank heavens!

With the various tines available for aeration, it can be difficult to decide upon the correct course of action. It is important that, following each operation, the decision makers assess the effectiveness of tine selection and adjust future operations accordingly. Many resort to using 8mm hollow tines during the summer to remove thatch build-up and increase nutrient and water penetration. These small holes are extremely difficult to fill uniformly and sometimes result in uneven surfaces that require additional applications of top-dressing. Although more disruptive, 12-15mm tines create holes that can be filled uniformly and, if timed correctly, recovery can be achieved within seven days.

Cross, slit and chisel tines, which create small incisions in the surface with minimum disturbance, would be the best choice for summer aeration. These tines increase gas exchange within the profile, improve nutrient penetration into the soil and aid the removal of surface and subsurface water. It is doubtful whether these operations in themselves will relieve compaction substantially, but the act of moving the soil will encourage new roots to develop and help reduce Black Layer if present.

Over the years I have seen many aeration ideas come in and go out of fashion. For example, in the early 70s, Sisis developed a pedestrian aeration machine called the Autocrat, which would hollow tine a green to a depth of four inches (100mm) with half-inch (12mm) hollow tines. It



would take one man approximately one to one-and-a-half hours to aerate a green and another hour for two men to collect the cores. Aerating greens with this machine was a slow process compared to the speed at which it can be achieved today.

Then in the mid-80s development moved towards tractor-mounted aeration machines with the Core Master being the forerunner to today's machines. Recently Toro has launched the pedestrian ProCore 648 greens aerator (see picture), which can aerate 18 greens in less than a day, providing you can collect the cores quickly enough.

Scarifying in the early 70s was implemented with a machine called a Bluebird. This could be set to penetrate to a depth of 20mm into the green with blades spaced at approximately 20mm apart. This operation became unfashionable through the 90s but has been resurrected with today's Graden machines and a phrase called 'linear aeration'.

A machine that was very popular for several years was the Subair, a pedestrian vibrating mole plough that could be fitted with three blades up to 225mm deep. I remember once visiting St Andrews during the early 80s when Walter Woods had used this machine, in two directions, on the Old Course greens and the greens had been cut into neat cubes. Fortunately this was during the autumn and the turf recovered quickly. Newer versions of this machine have come and gone over the years and will, I am sure, reappear in the future.

Aeration is the most important operation that can be implemented on a golf course and there are few procedures that produce as many benefits for the grass. (See Table.)

THE BENEFITS OF AERATION

- restructures deflocculated soils
- reduces compaction
- improves surface and subsurface drainage
- breaks down thatch by increasing microbial action
- reduces Black Layer
- increases aerobic microbes, which increases root development and improves drought-resistance
- reduces dry patch
- allows top-dressing to be incorporated into thatch and soil without layering
- increases overall health of the turf

Aeration must be implemented regularly throughout the year at varying depths to deliver all of the benefits shown in the Table. It is evident that many courses in Britain use three main types of aeration:

- **Verti-draining, with a small amount of heave set on the machine, once during winter with 19mm tines to a depth of 300mm**
- **Hollow tining once or twice a year with 12-15mm diameter tines to a depth of 100-125mm**
- **Slit, chisel or cross tining at various depths throughout the year**

The debate on 'sustainable golf' hinges heavily on aeration, sensible use of water, fertilisers, fungicides, pesticides and so on. Aeration helps the grass develop deep roots that, in turn, will ensure that the



grass is in a healthy condition when adverse weather conditions occur. The constant wet weather of this summer will have resulted in more compaction on most greens, because water acts like a lubricant in assisting the movement of small clay particles within the soil to block up the pore spaces.

A combination of Verti-draining and hollow tining will be required to reduce deep compaction and remove thatch build up. I would recommend that these operations are implemented one after the other – ie, Verti-drain with 19mm tines to a depth of 225mm and then hollow tine with 12mm tines to a depth of 100mm. Hollow tining will close up most of the Verti-drain holes and recovery will occur within the normal timeframe despite two disruptive operations being implemented together.

Once the cores have been removed, top-dressing should be applied to fill in the holes. It is important that these operations are implemented when the soils are moist, but not waterlogged, as there is no benefit if the holes remain full of water for several weeks.

Ideal conditions in which to aerate are when the soil is dry and friable.

ABOUT THE AUTHOR

Bruce Jamieson is an agronomist who runs his own consultancy, and is well known in the greenkeeping industry.