TIMING is of the essence!

Richard Windows looks at how the climate has changed and how this should affect the timing of some regular agronomic practices

In order to achieve the best results from deep aeration the underlying soil must be relatively dry, particularly on heavy soils. Historically, the conventional time for deep aeration has been during the autumnal months, ie September to November. However, some recent data from the Climatic Research Unit, University of East Anglia, has shown that in the past ten years, our weather, particularly during the autumn/winter months, has become increasingly wet.

Consequently, the soils on many of our turf areas have become wet, often saturated, earlier in the autumn than previously, meaning deep aeration cannot be achieved or, if it is, with much less success. If sportsmen and women require better winter playing surfaces they must not restrict the aeration programme from adapting to this climate change, by allowing earlier aeration operations to be accomplished when the soil is guaranteed to be drier and therefore more receptive.

ANALYSIS OF THE RECENT CLIMATIC DATA

The latest data from the Climatic Research Unit and the Hadley Centre has unequivocally shown that the climate has changed (probably due to the effects of global warming). The trends in the data show that the total amount of annual rainfall has increased but, more importantly, the amount of precipitation during the winter months has increased hugely (see Figure 1 opposite). In contrast, the total rainfall during the summer months has decreased slightly in the past ten years - there must surely have been a mistake!

Further analysis of the climatic data shows autumn rainfall has increased hugely in the past ten years. During the period 1961-1991, the percentage difference in September and October rainfall compared to August rainfall was 2% and 12% respectively. In the past ten years the difference has increased to a staggering 23% and 28% respectively (see Figure 2 opposite), essentially meaning our autumns are much wetter than they ever used to be.

The increase in autumn/winter rainfall is not the only climatic factor to have changed. The hours of sunlight in the autumn months have also reduced in the last decade.

THE IMPACT ON THE TIMING OF DEEP AERATION

The success of deep aeration is largely determined by the moisture content of the underlying soil. For 'optimum' results to be achieved the soil must be moist; not too wet or too dry. In 'optimum' conditions the heave action imparted on the tines from the deep aeration unit causes fissuring/cracking of the underlying soil. The effect of this is to increase the air space, deep in the soil profile, thereby allowing freer water movement away at depth (not to mention the promotion of deeper roots), subsequently resulting in drier, firmer surfaces.

However, the upshot of the above climatic data shows that more rain is falling from the sky earlier in the autumn than it ever used to and also the drying effect from the sun has reduced, resulting in lower rates of evapotranspiration. The net effect of all this means the soils beneath our playing surfaces will be wetter than in the past, therefore compromising the benefits of deep aeration operations.

THE SOLUTION?

Simple, bring forward deep aeration to a time when the soil is likely to be drier and therefore more receptive to the operation. This change of timing will be related to conditions such as soil type, drainage capability, etc. Regional climatic differences will also play a role in optimum timing.

THE RESULT?

In essence, there will of course be a small amount of inevitable disruption to the playing surfaces but course managers and head greenkeepers who achieve late summer aeration operations all seem to do so with astounding success. The minimal disruption to the surface (if done properly) is short lived as temperatures are higher and sunlight is more intense and frequent in late summer (August), compared to early-mid autumn (September-October). This means the growth rates and recovery of the grass plant are greater, as photosynthesis remains active. Another benefit is the fact that the grass plant can invest the assimilated photosynthate into the production of new roots down the cracks/fissures created by the deep aeration operation. This would not be achieved to the same extent if the operation were left to later in the year, as the rate of sugar production by photosynthesis would be reduced. The overall result of the earlier aeration operation essentially promotes better quality, freer draining, late season surfaces that can withstand the stresses of our increasingly wet winters. More importantly, it also ensures the grass plant will be stronger and quicker to respond to ongoing maintenance practices.

IT'S JUST NOT WORKING!

It is fair to say that on some golf courses the response from an earlier deep aeration operation is just not adequate enough to improve the winter playability of the putting surfaces. If this is the case, the only viable method remaining to improve the year round playability of the greens, in the increasingly wet climate, is to reconstruct them to modern, high performance USGA guidelines. Such a construction is designed to be free draining, ensuring that water will rapidly move through the soil profile and out through the pipe drains beneath the rootzone.

This may be an opportune time to also mention that it is wise to reduce irrigation in the late summer on greens that are prone to wetness problems in the winter (it will probably delay the onset of surface wetness if you can enter the winter firm and dry).

A TEAM EFFORT!

The achievement of earlier, late summer, deep aeration operations, to adapt to the increasingly wet autumns, is largely dependent upon the will and commitment of the particular turf manager involved. However, responsibility must also lie with committee members and players alike who should allow and ensure the operations are achieved with regularity. Sometimes this simply cannot be done due to the commitment to an important fixture or event. Hopefully, however, such engagements would be regarded as 'one-offs' and the 'fixture' of late summer deep aeration operations should be regarded as a firm date on, say, the future fixture cards of all inland golf courses, particularly those with heavy soils.

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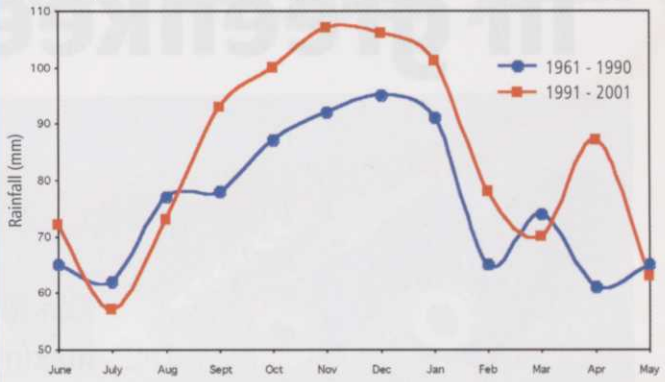
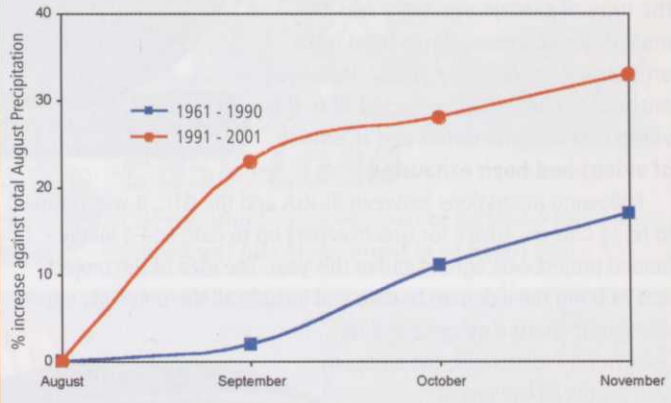
FIGURE 1 to show the difference in monthly rainfall during the periods 1991 - 2001 compared to the data from 1961 - 1990



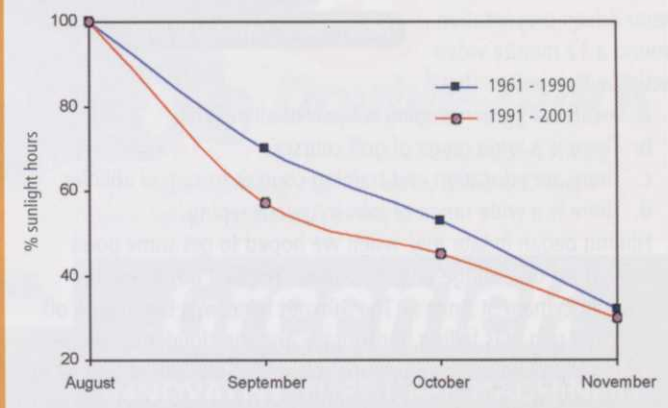
Data taken from; P. Hadley Centre 2001

FIGURE 2 to show the percentage increase in precipitation during the autumnal months (Sept-Nov) against the total amount of precipitation during August; over two different time periods 1961 - 1990 and 1991 - 2001



Data taken from; P. Hadley Centre 2001

Graph to show the percentage reduction in sunlight hours during the autumnal months (September-November) against the total hours of sunlight in August, given over two different time periods; 1961 - 1990 and 1991 - 2001



Data courtesy; Hilton, E. Morley Agricultural Research Station