

Conserving

WATER

As we face summer after another dry winter with decreasing water reserves, some restrictions against water use must come into effect soon. Where water is supplied from the public mains there could be significant reductions in water quotas and/or restricted hours for watering. *

To date there has been little effort in conserving water during the warmer summer months, with the generally accepted practice throughout the summer in the absence of rain being to water daily. Many accept this as the best method of keeping the optimum water levels and maintaining good vigorous turfgrass cover; and indeed some authorities even recommend this approach.

If the condition of the plant is examined and the water content of the rootzone inspected then there may be no need to apply water quite so frequently. The prevailing weather, the extent of the root growth and the vigor of the grass sward will all determine the amount of water that is used by the plant. Furthermore, by applying a light watering there is no possibility of any deep penetration of the water into the rootzone and the upper 25-50mm of soil is maintained at a level above or close to field capacity, often at the expense of a good supply of air. Grass roots are readily supplied with water and succulent growth results. There becomes no need for roots to move in search of water and deeper root growth is not encouraged.

In considering the actual amounts of water involved, a sprinkler system consisting of four pop-up sprinklers around a green generally applies water at the rate of approximately 25-40mm per hour if part circle sprinklers are used. The duration of watering each night varies from 4-10 minutes. In six minutes 4.2mm could be applied on a daily basis and accordingly 29.4 is applied in a week.

Understanding the extent of water loss

If evaporation is measured from an open water surface in the South East during the hottest months of June through August, it can be seen that generally 26-32mm of water is lost in a week. Considering losses from the turfgrass plant – firstly, water lost from the plant can only pass out of the plant stomata. Secondly, water loss from the soil will not be consistent but will reduce steadily as the top layers dry out and water has to move up to the surface by capillary action. It therefore becomes fairly logical to accept that the total amount of water lost by evaporation and transpiration (evapotranspiration) is a good bit less than the amount lost from an open water surface over the same period.

In the warm day that follows the daily irrigation, evaporation from the soil surface is at maximum rate – being adequately supplied with water – until the soil surface begins to dry out. Whatever application is made the previous night a good majority of this amount is soon lost by evaporation and the ready transpiration of a well watered grass sward.

No actual water losses have been measured but formulae have been derived to estimate this total loss and depending on weather, soil and plant conditions as well as the height of cut, the amount can be in the region of 60-80% of the water loss from an open water surface.

With the weekly amount of water applied by way of daily watering, the loss each day must initially be at maximum, reducing during the day. Notwithstanding this fact, the

weekly amount applied (29.4mm) is far in excess of the amount needed (20.3mm = 70% of 29mm average).

by GORDON
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Conserving water in the rootzone

If watering is not applied daily during the hottest months, but every 3-7 days, and sufficient water is given to meet the rootzone only, it can be readily seen that the total of the daily amounts applied is not necessary; and if applied will be in excess of the water holding capacity of the rootzone. (It was interesting to read in the April issue of Les Adams's account on water requirements in South Africa). In programming less frequent watering it must naturally be borne in mind that the grass cover is never put under any undue stress and this can be readily gauged by the firmness in the leaves – in other words the resistance of the grass cover to spring back after walking over it.

Not only does the soil dry out a little in the surface layers but roots are encouraged to go deeper into the rootzone for moisture. Annual meadow grass, although having the potential for deeper root development, will confine its root growth to the surface layers when moisture is readily made available. By drying out the surface, meadow grass growth can be discouraged.

The overall benefit of infrequent watering is a better water use rate. The grass plant is less succulent, less water is utilized and there is a better possibility of sustaining an adequate air supply in the rootzone.

Practical implications

Many will scoff at this suggestion. There is the inconvenience in the case of earlier automatic controllers. With the rate of application generally higher than the infiltration rate of the soil, recycling will have to be practised.

It is important to note that it is not being stated that watering is necessarily left to one application per week. In view of the time needed to repeat the cycle once or twice, it may not be possible to complete the watering in one night. Much will depend on the permissible flow rate, the type of equipment installed and reducing the application rate, but obviously it would be preferable to complete all the greens in one night than to water only half the greens and tees in a night. To the observant greenkeeper it soon comes apparent what interval is best suited to his rootzone mixture and the condition of the turfgrass cover.

If sound management practices are followed, the greenkeeper will be assessing his programme daily, based on the weather conditions experienced and the rain, if any, that has fallen. It will be found that by establishing an interval between irrigations and securing deeper penetration into the rootzone, the quantity applied will be 20-40% less than the cumulative amount applied on a daily basis – and most important of all the turfgrass plant will become more drought hardy.

* *Written in April, this prediction has proved prophetic.*

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