

Philip Sharples takes a look at what can be achieved today with the help of modern technology, knowledge and water

Water^{saving}



Where does water come from?

Water, there is only so much of it and nature is not making new supplies, only recycling a portion of it. In fact, much of the world's water supply - in excess of 99% - is unavailable for man's most important uses - drinking, manufacturing, sanitation, recreation and irrigation because it is tied up in the world's oceans and polar ice caps.

The amount of water on earth is essentially non-destructible and fixed. Certain types of volcanic eruptions add small amounts of new water, but it is insignificant in the

overall scheme. World wide, some 80,000 to 85,000 cubic miles of water evaporate from the oceans each year.

So now we know a little about this resource do you think we should begin to save, reuse or recycle the water available to us? When applied to turf grass management, it boils down to some very fundamental, down-to-earth changes in habits and practices.

Water Conservation

Every turf grass manager, in the entire world, surely must begin (if not already) to plan and implement a

programme of water conservation and wise management of this finite resource. The immediate results will be savings in cost. Less water will be consumed, which will result in a reduction of the pound spent for the water and the cost to pump and transport it.

But more importantly, far more importantly, it will help the turf manager prepare for the day when it will become necessary for him/her to function with less water. Perhaps the water simply will not be there, physically, (save this year!) in the current quantities or because some bureaucratic or legislative authority will

have diverted it to a purpose considered more politically important.

There are six basic steps that will lead to water conservation and improved management. These often receive far too little attention and respect.

1. Establish watering priorities. Give the highest priority to the most intensively managed areas.

2. Improve irrigation scheduling. Follow sound irrigation practices. Irrigate when there is the best combination of reduced wind, low temperature and high humidity.

3. Reduce, or avoid where possible, other causes of stress. Make certain there is adequate internal soil drainage to ensure maximum root growth. Most importantly avoid root zone saturation.

4. Alter cultivation practices. Test for soil fertility. Raising the height of cut for all areas by as little as 1mm can have a significant effect on the ability of the grass to tolerate stress and make more efficient use of soil moisture. Increase the frequency of soil cultivation to trap moisture and hold it in the vicinity of the root system.

5. Expand the use of mulches.
6. Erect wind barriers on large expanses of open space.

Water Management

It is thought that many involved with the turf management business are guilty of misusing water, to a less-

er degree on golf courses. Yet golf courses do not take full advantage of the many technical accomplishments of the irrigation industry. We must integrate the art of water management and the science of water management. The consequences of not applying what is now known and available in these areas is that we are borrowing a major source of water from the future and missing an opportunity to become leaders as water conservation authorities.

We need to learn more about such things as drought tolerance and rooting characteristics of grasses, water requirements, watering techniques, water conservation, soil-air-water relationships, leaching, weeds and their ecological relationship to the turf grass environment.

As you have read, there are many factors and variables involved with effective irrigation. I would like now to concentrate on one aspect, Irrigation scheduling and application.

Irrigation scheduling and application

Irrigation scheduling technology (computer aided) has developed rapidly and now assists in reducing; water run-off, leaching, salt accumulation, excess evapotranspiration (ET) as well as, monitoring system effectiveness, storing all data and setting application timing, in the field and/or in the office.

The decision to irrigate turf should be made on an "informed" basis. Too frequently irrigation practices fail because they have been established by habit or calendar reference dates. Actually, good irrigation practices are dictated on a day-to-day basis by specific turf grass needs, soil characteristics, projected weather conditions and the purpose and function of the area to be irrigated. Thus, the criteria affecting the decision-making process concerning irrigation involve a dynamic, ever changing set of conditions which all must be assessed by a Course Manager with intimate knowledge of the criteria.

A responsible Course Manager will consider the temperature, atmospheric relative humidity, cloud cover and wind conditions effecting the evapotranspiration rate, plus the anticipated rainfall for the next few days. Finally, an assessment must be made as to the capabilities and weaknesses of the irrigation system in relation to supplying the needed amount of water within a specific

amount of time. (PC operated systems do this for you automatically!) Based on these evaluations only, decisions are made as to when to water and how much water to apply.

This decision is made even more complicated because soil moisture content will vary at different locations on the golf course. Some sites may tend toward perpetual wetness, while others rapid drying. Consequently, the irrigation programme must be adjusted for the variable soil and drainage conditions.

Technological tools assisting irrigation scheduling practices, recording plant growing days and cataloguing fluctuations in rainfall and temperatures (environmental monitoring equipment) also play a vital role, there are three main types utilised:

1. Soil based, to monitor soil water status these include, soil moisture sensors, tensiometers and infiltrometers

2. Plant based, to monitor plant temperatures and water status, the best available technique here (at this moment in time) being visually watching for wilt. I am sure one day chromatography - infra-red mapping of canopy temperature - will be a viable technique.

3. Atmospheric, to monitor atmospheric conditions that influence ET rates, these include, wind speed monitors, temperature gauges and evaporimeters.

All the above used and recorded daily through a weather station and software support will help ensure Best Management Practices are adhered to and utilised.





Packages are available that are specifically designed and developed to assist the turf professional and can advise on all the aforementioned.

All the pre-mentioned, what we will call a "modern system", allows irrigation according to evapotranspiration and soil conditions in a condensed amount of time. A shorter irrigation cycle not only saves money and general wear but starts the system later at night, giving more time for rain and reduced irrigation time reduces inconvenience and irritation to golfing memberships.

In Summary

Installation of a state-of-the-art computer operated irrigation system, or modernisation of the existing can only achieve optimum irrigation scheduling and application.

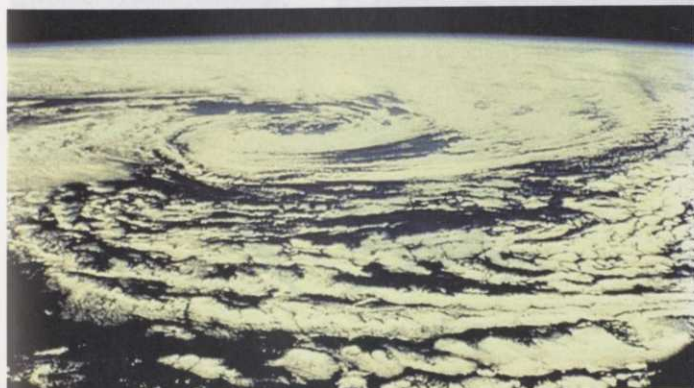
Significant reductions in pesticide usage, fertiliser applications, electricity costs, water usage and even manpower can be achieved by applying best management practices. A

computer efficient, low-pressure irrigation system (low-pressure water is less effected by wind) and site-specific heads allows for low water use and maximum coverage. Optimum water usage means to the turf manager a decrease in:

- * Soil compaction.
- * Fertiliser leaching
- * Salt accumulation
- * Disease susceptibility
- * Wear and tear and pumps and irrigation systems
- * Weed population
- * Insect population

But, perhaps most important of all, it shows the world that the turf grass managers are in fact very environmentally friendly and aware. What do you think?

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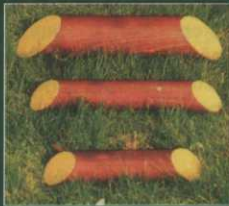


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