

Tools of the turf trade



Inexpensive yet often overlooked, simple tools such as (from left) a pH/EC/TDS meter, hand lens and soil temperature probe should form part of a superintendent or turf manager's arsenal

Aside from a keen pair of eyes and knowledge of their patch of turf, a superintendent needs to rely on the expertise of the crew in order to effectively manage their facility. However, as John Geary examines in this instalment of Tech Talk, there are also a number of handy and inexpensive tools which can be employed to help while out in the field.

Something that sets turf management apart from other trades such as electricians, plumbers and carpenters, is that trainees and apprentices usually do not have to outlay significant sums of money investing in tools needed to carry out their daily tasks. This is generally because employers supply the bulk of tools needed to perform every day duties.

While the purchase of turf management text books is an essential part of gaining a boarder base of knowledge, there is also a range of inexpensive tools which turf managers can use to regularly assist in monitoring plant growth and the health of their turf surfaces. In this instalment of Tech Talk we look at some of these and how they can play an integral role in the smooth running of your operations.

INFRARED THERMOMETERS AND STRESS DETECTION GLASSES

During periods of heat stress, turfgrasses invariably use less water which in turn means the effect of evapotranspiration reduces causing the foliage to heat up. Leaf cells of cool-season turf will start to die when foliage temperatures exceed 43°C – this is known as high temperature kill – however even at foliage temperatures of 35°C to 40°C heat stress can cause problems such as a run down of carbohydrate reserves and greater susceptibility to various pests and diseases.

Insects for instance, can smell the ethylene and other stress compounds being given off by turf suffering from heat stress. A golf green which has poor sprinkler uniformity will see insects target these areas under drought stress.

The use of handheld, point-and-shoot infrared thermometers is a quick and easy way for practitioners to measure canopy temperatures. These devices, which sell for as little as \$400, can be a valuable tool in identifying hot spots where poor irrigation coverage, poor root depth and dry patch problems give rise to stressed areas.

Stress detection glasses are also aimed at helping turf managers detect stressed turf. One such brand marketed sells for approximately \$160 each and they claim to allow you to identify stressed turf well before you could identify such areas with the naked eye.

SOIL TEMPERATURE THERMOMETER

Measuring soil temperatures is an invaluable gauge to what is happening within the root system. As outlined in this column in ATM Volume 11.5, the root systems of C₃ grasses reach their optimum growth rate during spring when soil temperatures reach 16-17°C. At this point, new roots are formed which replace most of the older roots which senesce. Once the soil temperature rises above 17°C, cool-season root growth will slow down until it completely ceases when soil temperatures reach 24-25°C.

Similar to C₃ grasses, C₄ grasses have an annual root system with the major replacement period occurring in spring, just after breaking dormancy. The root replacement of warm-season grasses is more concentrated than cool-season grasses and occurs when soil temperatures reach 17-18°C. As soil temperatures increase during summer, root growth and recovery becomes stronger with the maximum rate of root growth occurring when soil temperatures reach 24-30°C. Throughout the winter months warm-season grasses retain some shoot and root activity provided the soil temperatures are above 10°C.

While there are a range of soil temperature probes available, without a doubt the cheapest are the portable cooking temperature probes. Costing as little as \$20 these probes have a digital readout which are reasonably accurate, allowing you the flexibility to check soil temperatures over a range of areas such as greens, tees and fairways, quickly and easily.

SOIL PH KITS

There will also be times when turf managers need to measure a soil's pH level. While a soil pH test is best conducted by a NATA-accredited laboratory, there are a number of kits available which are ideal when a quick response is needed.

Most kits are based on mixing an indicator solution with a soil sample which produces a distinctive colour reaction depending on the pH

of the soil. This is then compared to a colour card showing the correspondence between colour and pH. Designed to be used in the field, these kits cost around \$50 and while reasonably accurate should be used as a guide only.

PH/EC/TDS PROBES

Measuring water quality has become increasingly important as turf managers are forced to irrigate sports surfaces with alternative water sources. For practitioners who rely on effluent water for irrigation it is particularly important to regularly monitor water salinity and pH. Salinity is seen as the key indicator of irrigation water quality with high-salinity water causing an increase in soil salts. As soil salinity increases it becomes more difficult for plants to extract water from the soil.

Portable pH/EC/TDS probes cost around \$300 and should be used to gauge seasonal fluctuations in water quality. As a general rule, salts exceeding 1000 mg/L (about 1.5dS/m) severely limit water use on turf, however, this is dependent on grass species and variety, soil type, thatch level and irrigation and soil management.

CATCH CANS

It is not possible to achieve efficient irrigation if water is not applied uniformly. The 'catch can' test is a quick and simple method to determine sprinkler uniformity and they can be purchased for under \$10 each. Catch cans should be placed at regular sprinkler intervals within the sprinkler pattern and the system then run for sufficient time to ensure that a measurable amount of water is collected.

The preferred measure for turf is known as Distribution Uniformity (DU) (Connellan 1997). The DU places emphasis on areas of turf that receive low amounts of water and is calculated by comparing the average of the lowest 25 per cent of can readings to the overall average. The equation is:

$$DU (\%) = \frac{\text{Lowest 25\% of readings}}{\text{Average of all readings}} \times 100$$

A DU greater than 85 per cent is considered acceptable for turf sprinkler systems and as well as providing information on system uniformity, the test also gives a precipitation rate in millimetres/hour.

HAND LENS

The humble hand lens or magnifying lens is another cheap and portable tool which is invaluable when it comes to identifying potential pests and diseases. A 10x or 20x lens is a good general purpose magnifier for small insects, mites and plant diseases.

When used in conjunction with a disease key or guide, such as outlined in Smiley's 'Compendium of Turfgrass Diseases' (3rd Edition)', many diseases can be identified. Examples include fruiting bodies of *Colletotrichum* spp., *Anthraco*se as well as spores of *Phoma* and *Leptoshaerulina* leaf blight.

An alternative method for indentifying potential insect pests is to use a mix of pyrethrum insecticide and water at a ratio of 20:1. This method is particularly effective for monitoring stem weevil and flea beetle numbers in greens. The procedure involves spraying the mixture onto an area you suspect is infected with insects.

You will need to observe these areas for up to five or 10 minutes as the mixture acts as an irritant and insects will slowly come to the surface whereby they can be easily counted. In the case of stem weevils, if you observe greater than three to four adults per square metre, a curative application of insecticide may be necessary.

STIMPMETER

One tool which needs little introduction to superintendents is the stimpmeter. Used to measure putting green speed, the stimpmeter is a 36-inch extruded aluminum bar with a grooved runway on one side. A notch in the runway is used to support a golf ball until one end of the stimpmeter is lifted to an angle of roughly 20 degrees. The putting speed is measured after three balls are released in two directions and the distances traveled averaged.

Since being released in 1978, many turf managers believe the stimpmeter has placed too greater emphasis on the pace of greens, in particular quick greens, to the detriment of the overall condition and management of putting greens.

However, the use of the stimpmeter was and still is aimed at measuring differences in uniformity between greens. Armed with this information superintendents can then adapt their management practices of individual greens to achieve more consistent speed across all greens. Another use is to measure the speed of intended pin locations on contoured greens to see if they vary greatly from the rest of the green.

Used responsibly, the stimpmeter can be an excellent tool in helping to provide firm, smooth, consistent putting conditions.

PROFILE SAMPLER

Often overlooked, it is important that turf managers regularly check the soil profile to analyse what's happening under the surface. Tools such as a 50mm soil profile sampler or hole changer are perfect for analysing soil type, moisture content, thatch depth, rootmat depth, root health and root depth.

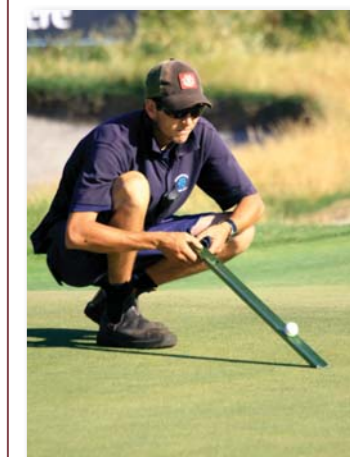
All of the tools outlined above can be used by practitioners to assist in monitoring turf health. However, probably the most important tool a turf manager has at his or her disposal is observation. Having a keen eye and reacting to changes as they happen is what sets the best turf managers apart from the rest.

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Catch cans are a quick, simple and cheap way of determining sprinkler uniformity



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