Turf Solutions

Drought Management

With the first Emergency Drought Orders now issued for over a decade, water, or lack of it, is now a key concern across large areas of the UK. Golf courses, sports facilities and amenity areas are under increasing pressure to reduce water use.

With Global warming weather patterns resulting in extended periods of dry weather, even courses with extraction licences or reservoir facilities will have to make far better use of available water resources in the future.

Use of irrigation for turf areas is always high on the turf management agenda regarding environmental issues and sustainability. Over-use of irrigation systems in the past have been responsible for creating poor playing surfaces and encouraging sward invasion from weed grasses such as *Poa annua*.

Now we are seeing certain parts of the country affected by drought and restriction on water use for irrigating turf it is vitally important for the turf manager to make sure that management practices are geared towards creating turf that is sustainable in drought or minimal input irrigation conditions.

Drought Management Agronomics

To create a drought tolerant grass sward there are a number of factors that need to be considered:

- Reduce compaction.
- Increase appropriate aeration – helps to encourage deep rooting.
- Reduce thatch build up – verticutting, grooming etc.
- Only very light top dressing treatments, avoid completely in very dry conditions.
- Raise height of cut.
- Use hand mowers to reduce stress.
- Encourage grass species that are tolerant of drought conditions. Fescue, Colonial bent grass, smooth stalk meadow grass etc.
- Appropriate use of nutrition to encourage rooting without excess vegetative growth. Maintain nutrients responsible for stomata regulation such as K, also Ca for cell strength.

Nutrition & Drought

Avoid high applications of Nitrogen during drought stress. If the plant already has access to sufficient N and a good root system excess nitrogen will cause the plant to produce excessive vegetative growth at the expense of the root system. This is especially important in the late spring when grasses are growing rapidly

The use of appropriate amounts of Potassium in your nutritional input programme can help to reduce plant stress caused by drought. Photosynthesis and carbohydrate production are reduced when potassium is low.

Potassium is also used by the grass plant to help regulate stomata function. Stomata are small openings on the cuticle of the plant. Their function is to allow entrance of gases and to help control water release from from the surface of the plant, this function becomes vitally important during times of drought stress or low water availability.

Drought Management Strategy - Products

- Use soil analysis to check for nutrient levels - provide programme to rectify any deficiencies.
- Especially important to maintain adequate levels of K and Ca.
- Avoid high salt concentrations at surface e.g. avoid over use of high acid reaction fertilisers, e.g. sulphate ammonia.
- Consider Sierrablen controlled release fertilisers as a base feed.
- Use Greenmaster liquid fertilisers on little and often basis.
- Late autumn nutrient applications!
- Greenmaster Blade program encourages roots to store essential carbohydrates, encourages indigenous mycoryhza = encourage rooting.
- H_2Pro – maintains more available moisture in soil, e.g. reduces irrigation requirement.
- Primo MAXX – encourages rooting, reduces evapotranspiration = less leaf area.

Typical Programme

- Sierrablen controlled release fertiliser = low scorch/ salt value and nutrient only slowly available.
- H_2Pro water conservation – reduces irrigation requirement.
- Maximise penetrant – use once Dry Patch established.
- Greenmaster Liquids – applies nutrient in low amounts, little and often.
- Greenmaster Blade – encourages mycorhyza = improves rooting and nutrient and water uptake.
- Primo MAXX – increases rooting, reduces drought stress.

Sierrablen

COATING: water-soluble fertilizer particles are coated to limit rate of dissolution and transport of nutrients:

- RESIN: Osmocote technology
- POLYMER: Poly-S technology

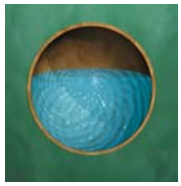
Release Mechanism – How Does It Work?

Granule as applied

All nutrients inside granule

Absorbs moisture/ pressure increases

Nutrient forced out of shell and slowly released



Empty organic based shell decomposes

Greenmaster Liquids

Core Range:

- High N 25-00-00+2MgO+TE
- NK 10-00-10+TE
- High K 03-03-10+TE
- Spring & Summer 12-04-06+TE

Specialities:

- Liquid STEP Trace Element Mix
- Iron 4 Fe 4% (EDTA chelated)
- Ca-Booster 08-00-00+10%CaO+TE
- Seafeed

Greenmaster Blade

What Is It?

- Based on carbohydrate nutrition.
- Simple sugars provide a readily available Carbon Source.
- Macro & Micro-nutrients:
  - Nitrogen/Phosphate/Potassium – 2.1.2
  - Iron/Manganese/Zinc plus other traces
- 5% Seaweed (Seafeed).
- The formulation is unique to Scotts – never been on the market before!

What Does It Do?

- Increased root mass – (Carbohydrate).
- Increased soil bacterial cell counts.
- Increased VA Mycorrhiza numbers.
- Improved visual appearance of turf.
- Improved Seedling Emergence.
- Increased grass growth rate.
- Increased rooting depth.

Proven By Research

- 3 year PhD project: Royal Holloway.
  - Increased Mycorrhiza.
- Royal Holloway Research (10 years of research).
  - Interactions between Blade and Seaweed = improved turf quality, increased shoot density, increased Mychorrhiza.
  - Increased beneficial microbial Populations in golf greens.
- STRI
  - Improved root mass (in presence of Seaweed).

PhD Research (Royal Hollaway College 2003) Showing increased bacterial activity, AM Colonisation and Increased rootmass using new unique formulation of Greenmaster Blade.

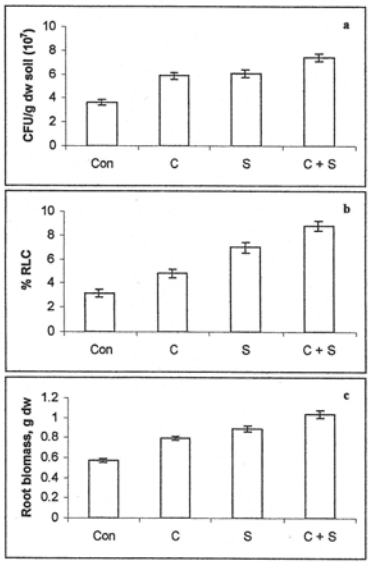
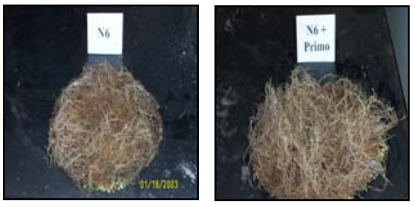


Figure 7.4 – Seasonal means of a) Bacterial abundance, b) AM colonisation, c) Root biomass. Con = Control, C= Carbon amendment, S= Seaweed amendment, C+S= Combined carbon and seaweed amendment.

Primo MAXX

Increasing Root Density

- Grass continues to grow.
- Energy normally used to produce vegetative growth is re directed downwards into the root system.
- Lateral stems and root-mass increase after repeat applications.



Clemson Univ. Research 2003.
3 x application @ 1.6lt/Ha rate applied over three months

Improves Drought Tolerance/ Reduces irrigation requirement

- Produces smaller leaves with less surface for transpiration.
- Improves rooting for access to deeper soil moisture.
- Improves water use efficiency (av. 20%).

Research conducted at Cornell, Kansas State, Texas A&M - 2001.

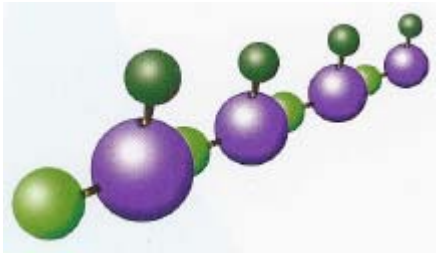
H_2Pro

Why is H_2Pro Different?

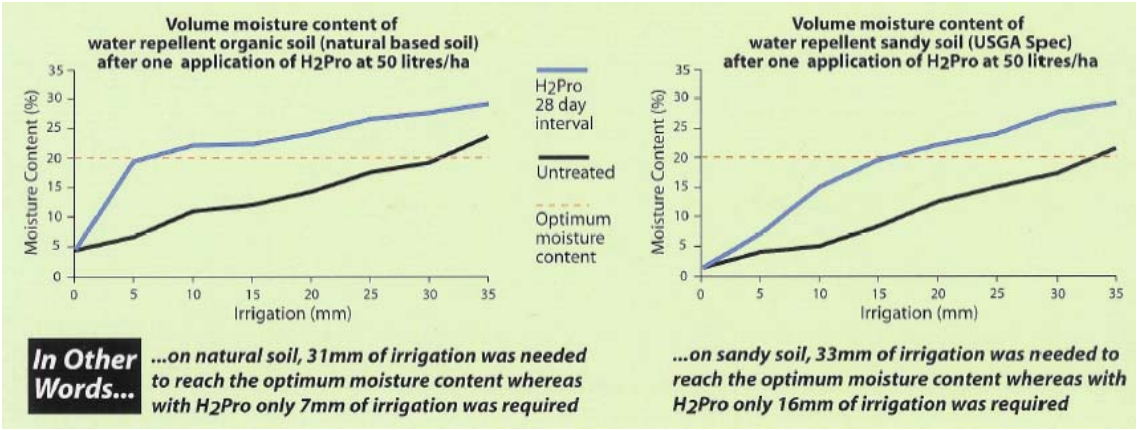
- New surfactant technology based on USA patented water conserver.
- Technology never used in European markets before.
- Unique mode of action that optimises water usage in the root zone and controls Dry Patch.
- Increases the effectiveness of applied irrigation.
- Reduces the amount of irrigation required to reach various ideal soil moisture contents.
- Treats both the causes and the symptoms of Dry Patch by.
    - Reducing the amount of wet / dry cycles in the root zone preventing the hardening of the water repellent deposits.
    - Allows water to hold in the water repellent areas allowing uptake by the turfgrass.
- Supporting work from Levington, Agro Chemex, Essex and University of Georgia.

Long Term Wetting Agents

- Unique residual wetting agent based on water conservation agent that hold the maximum amount of water to the previously water repellent materials and to some organic materials in the root zone.
- Three different chain lengths:
    - Short (4-6 weeks)
    - Medium (6-10 weeks)
    - Long (complete season)
- As the medium and long chain molecules break down, they re-attach themselves to the non-polar sites.



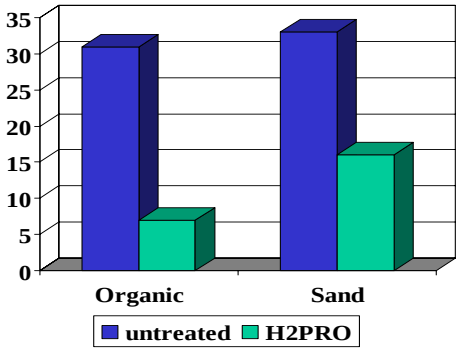
H_2Pro Improves Water Efficiency



H_2Pro Water Conservation Trials

Amount of irrigation required to reach ideal 20% soil moisture content:

- Organic:
  - Untreated 31mm
  - H_2Pro 71mm
- Sand:
  - Untreated 33mm
  - H_2Pro 16mm



The H_2Pro Range

The range consists of four different formulation types to optimise management options:

- H_2Pro Liquid
- H_2Pro Tablets
- H_2Pro Granules
- H_2Pro Maximise Liquid

The benefits of the range are as follows:

- Flexible use rates.
- Safer to users and turf.
- Easy to use.

H_2Pro Liquid Application Rates

Monthly:

- Initial application 25L in 600-900 Litres per Ha
- Monthly application 10L in 600-900 Litres per Ha
  (No watering in required).

Bi-Monthly:

- By-monthly application 25L in 600-900 Litres per Ha
  (No watering in required).

Annually:

- By-monthly application 50L in 2000 Litres (min) per Ha
  (Watering in required).