DGA Conference 2026

Michael Fance

Aquatrols Europe Limited



43 Years with Greenkeeping and Water

Agenda

- Introduction
- Background
- Soil moisture management
- Greenkeeping career experiences
- Key take home messages
- Questions and discussion

Introduction

Michael Fance MBPR FQA

Technical Support and European Account Manager

43 years in the industry

- 18 of those in greenkeeping
- 25 in consultative sales

BASIS FACTS

Introduction

Michael Fance MBPR FQA

Technical Support and European Account Manager

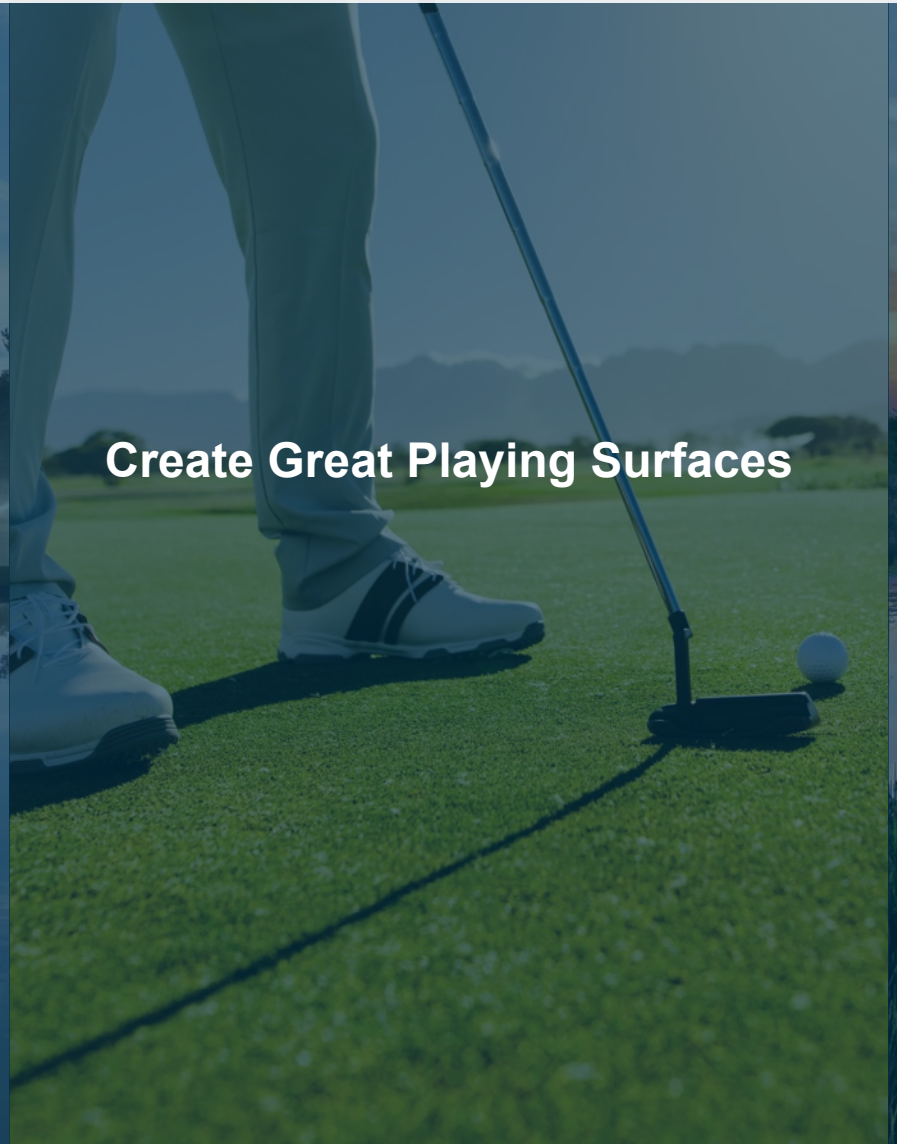
43 years in the industry

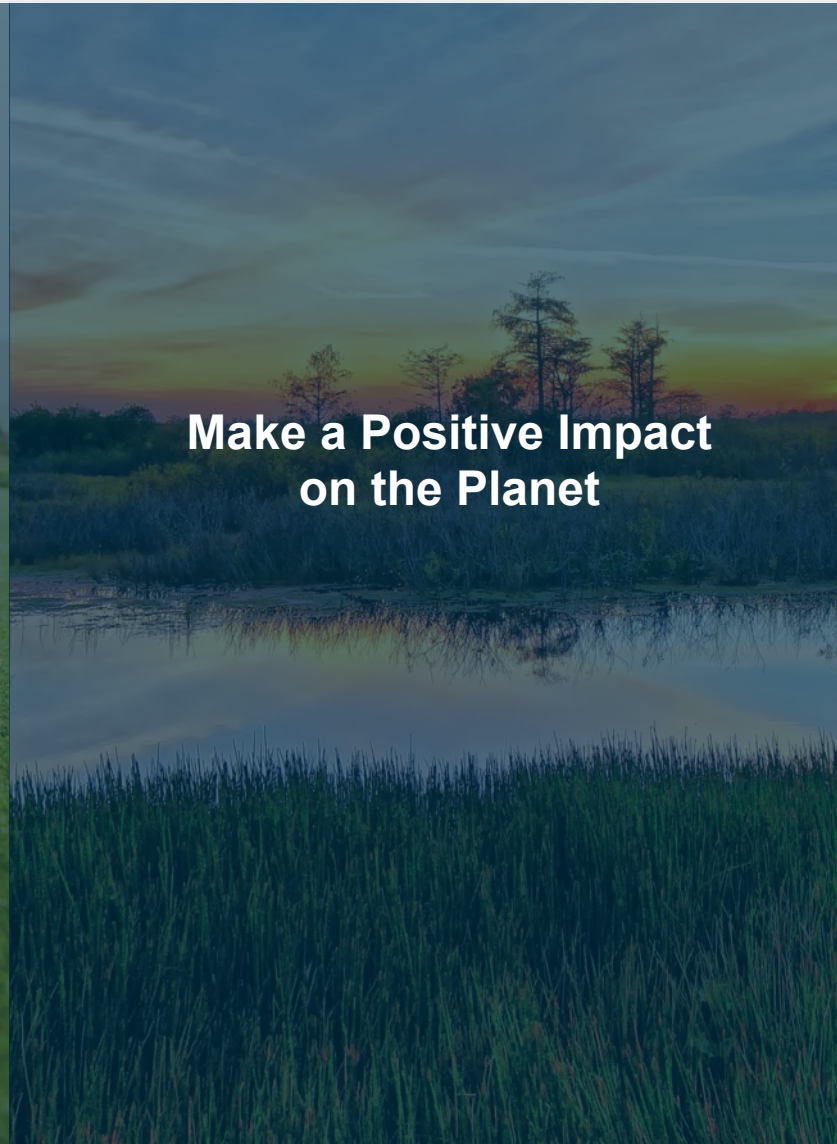
- 18 of those in greenkeeping
- 25 in consultative sales



Why We Exist…


Proactively Influence Water


Create Great Playing Surfaces


Make a Positive Impact
on the Planet



Create Novel and Innovative Chemistries

Products unique to your space in the marketplace

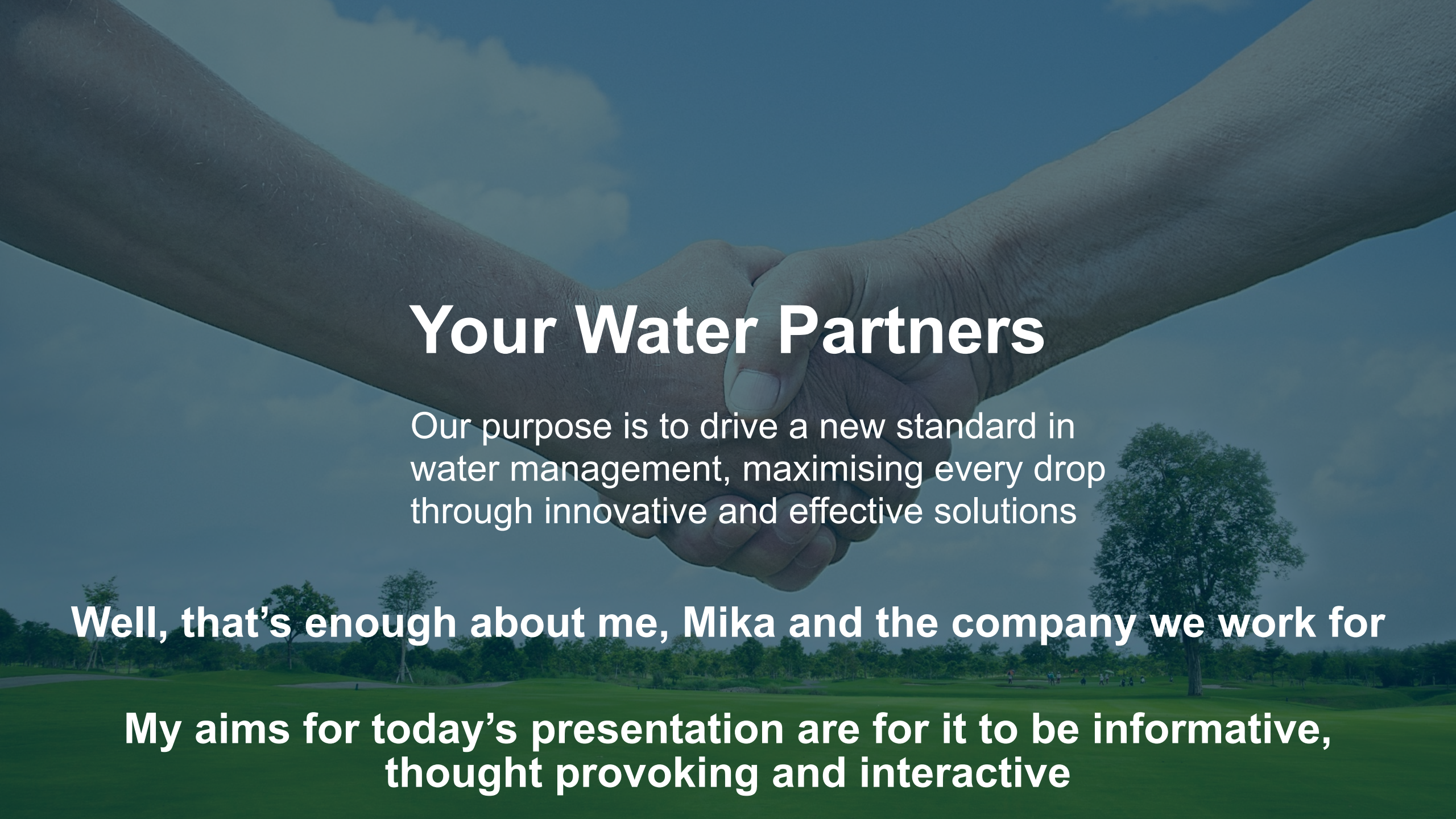
The Power of Partnership

A commitment to understand and respond to your needs

Impactful Solutions

Research, programmes and people focused on your success

LINDS



Your Water Partners

Our purpose is to drive a new standard in water management, maximising every drop through innovative and effective solutions

Well, that's enough about me, Mika and the company we work for

My aims for today's presentation are for it to be informative, thought provoking and interactive

Background




RESPECT
THE
DROP

Background

The Earth is known as the "blue planet" because of its proliferation of surface water. Water also exists as vapour in the Earth's atmosphere and below its soil surface. It should be noted, however, that this is a closed system and water is a finite source. Managing soil water levels is important not only for the health, quality, and performance of the turf playing surface, but also, arguably more importantly, that sports turf management is seen as a responsible user of this valuable resource, as the demand for fresh water increases worldwide

Background

The need for golf courses to be seen as responsible users of water has probably never been more prominent





CAUTION

Background

"We cannot expect a plant's productivity to be greater than the foundation and health of the soil"



Overall soil health is crucial

Background

"Good physics comes before good physiology"

- If a root-zone is physically healthy, the physiological health of the turf will benefit too
- Biological, cultural, and mechanical operations are essential
- Soil moisture management plays a role in this philosophy
- Integrated Turf Management includes soil moisture management

Background

Stefan Nilsson:

"Address the cause rather than treat the symptom"

Svenska Golfförbundet

But where does soil moisture management fit in?

Playability
Firmness (Clegg Hammer)
Hole-out test (Greenstester)
Stimp (feet)
Difference in speed between greens

Basic Conditions
Number of playable pin positions
Surface runoff
Incoming surface water
Infiltration rate (mm/h)
Organic matter (OM246)
Thickness of turf (thatch + mat)
Layers in the profile
Compaction (depth)
Root depth

Grass composition
Bent and fescue
Annual bluegrass

Injuries and diseases
Coverage with grass
Wear and tear from machines
Dry patches
Dry spots affecting ball roll
Active fungal diseases
Fungi affecting ball roll
Algae / Black Layer
Moss
Weed
Larvae
Nematodes

Nutrient requirements (kg N/Ha/year)	<100

//Stefan Nilsson, Swedish Golf Federation

Background

Optimal watering:

In managing grass effectively, good quality playing surfaces should be achieved with efficient minimal irrigation based on scientific monitoring, and records kept of consumption



Background

Water scarcity and cost are going to be increasing issues for golf. **Golf courses should be designed, built and managed to conserve water, using the least required to produce healthy turf and firm playing surfaces**. **Where feasible, water for irrigation should be generated in situ, through recycling drainage, rainwater harvesting, irrigation reservoirs and other technologies**. Where feasible, water derived from non-potable sources should provide the irrigation source. **Grass selection should be targeted at species which are fit for purpose, but which require the least amount of irrigation water**

GC2030

Soil moisture management

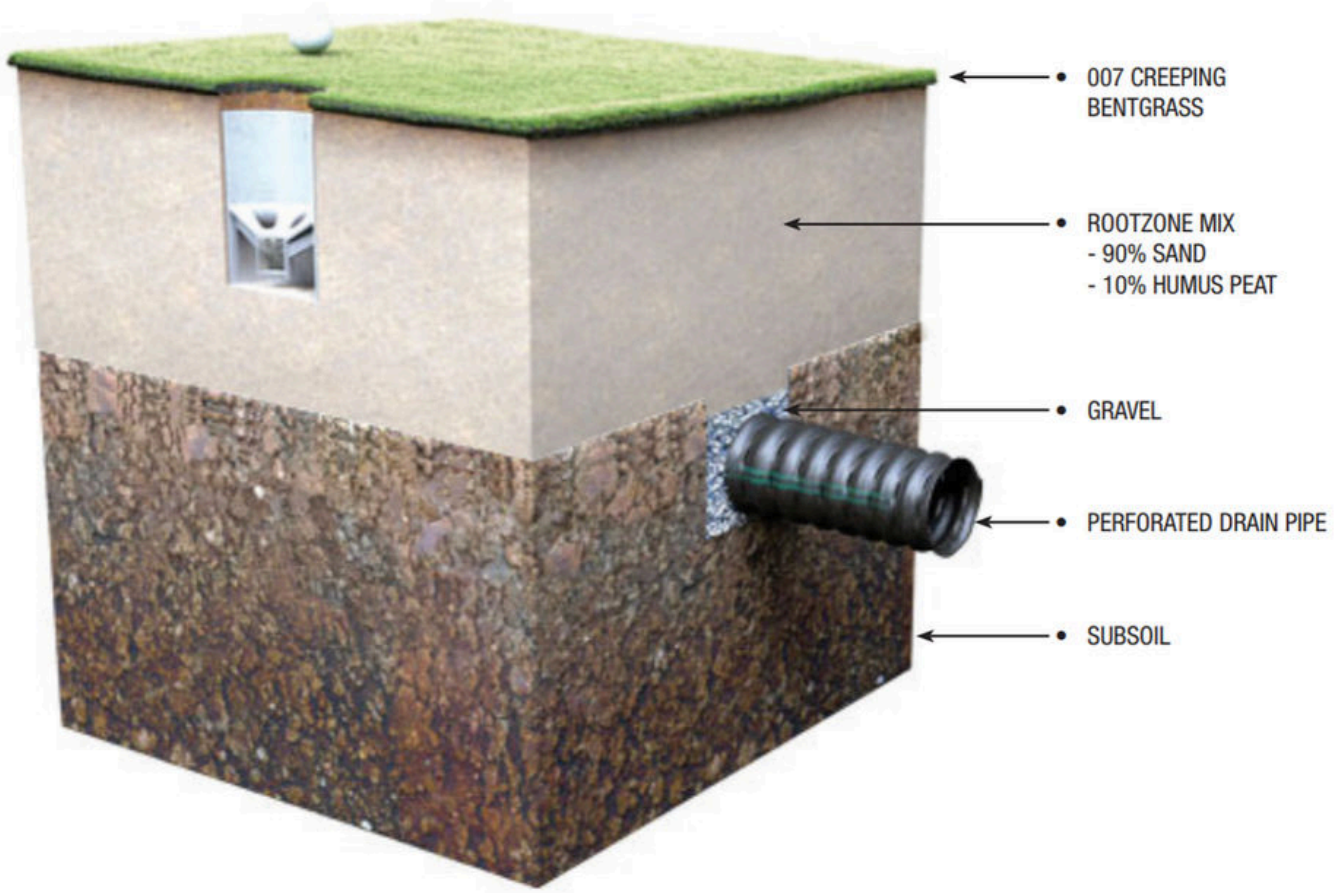


Soil moisture management

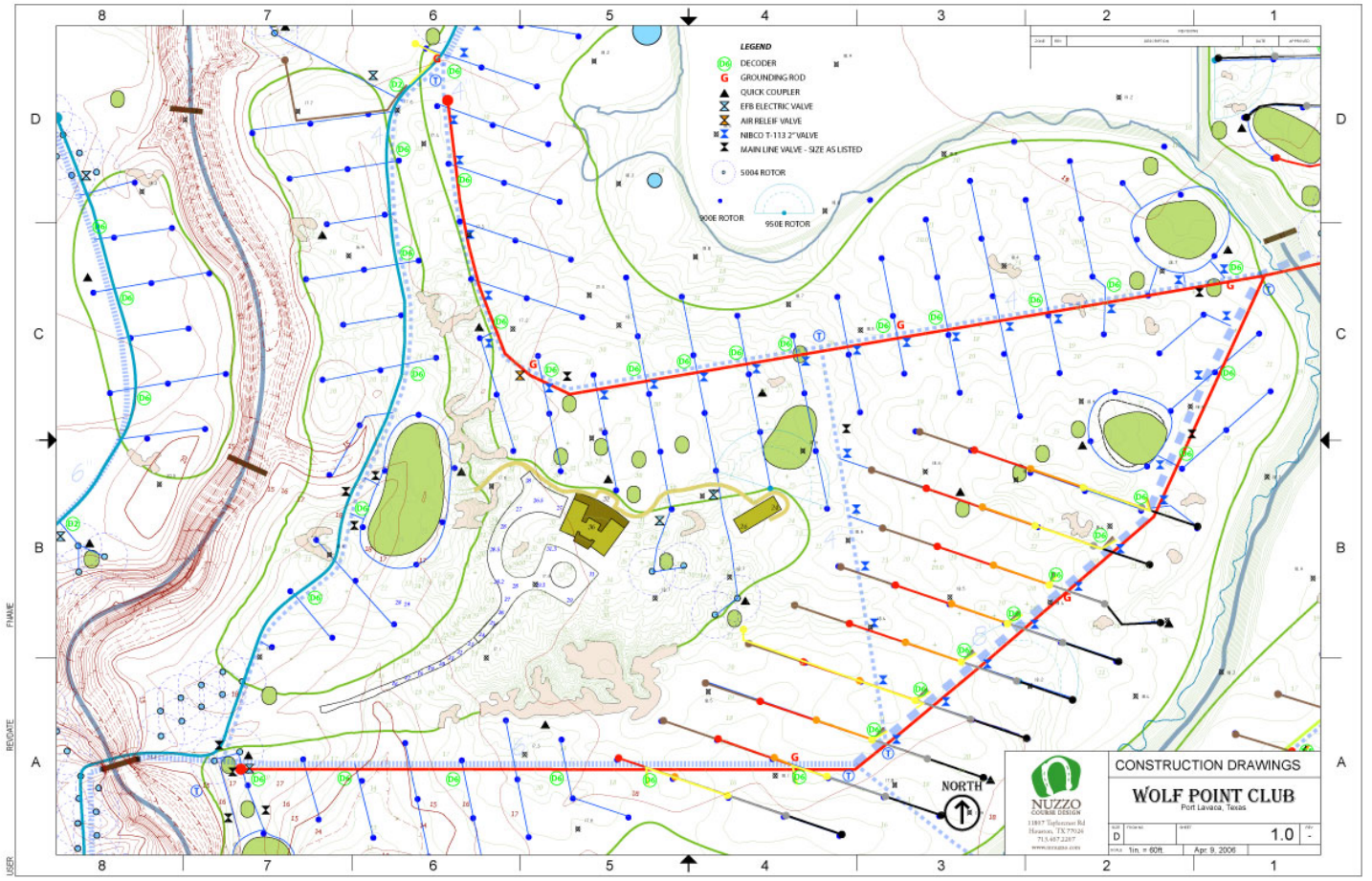
The use of soil surfactants and wetting agents as part of modern integrated turf management programmes

Soil moisture management

Humus peat is a dark, decomposed organic material that forms over long periods in wet, low-oxygen environments. For a grower, the simplest way to think about peat humus is “stable organic matter” that behaves like a sponge and a gentle nutrient holder inside the root zone



Soil moisture management



Soil moisture management

Correct soil moisture management can assist turf managers in achieving incremental gains as they face new challenges

Soil moisture management

A key fundamental for successful sports turf management

Soil moisture management

- Everything works best if the moisture level is constant on the surface and in the upper soil profile
- Everything works best when moisture levels are consistent vertically in the depth of the root zone
- Soil surfactants modify and manipulate the movement of water in the above two areas
- They cause the water to behave in a way that it would not have otherwise done

Soil moisture management

- The use of soil surfactants goes far beyond the avoidance of or recovering from hydrophobic problems
- Other soil-applied products work better
- Applied nutrients, as well as those already present in the soil, work better
- Soil surfactants can directly affect the disease triangle by altering the "environmental" side of that triangle
- Turf managers are realising there are novel uses for soil surfactants in a world of ever-reducing available pesticides

Soil moisture management

For any new construction, soil moisture management is at the heart of the planning, specification, and construction stages: irrigation and drainage systems designed to manage soil moisture 365 days a year.

If, after all this investment, soil moisture levels are inconsistent or don't match seasonal playability requirements, why not use surfactants to adjust them as needed to meet site-specific goals?

Greenkeeping career experiences



Greenkeeping career experiences





1983



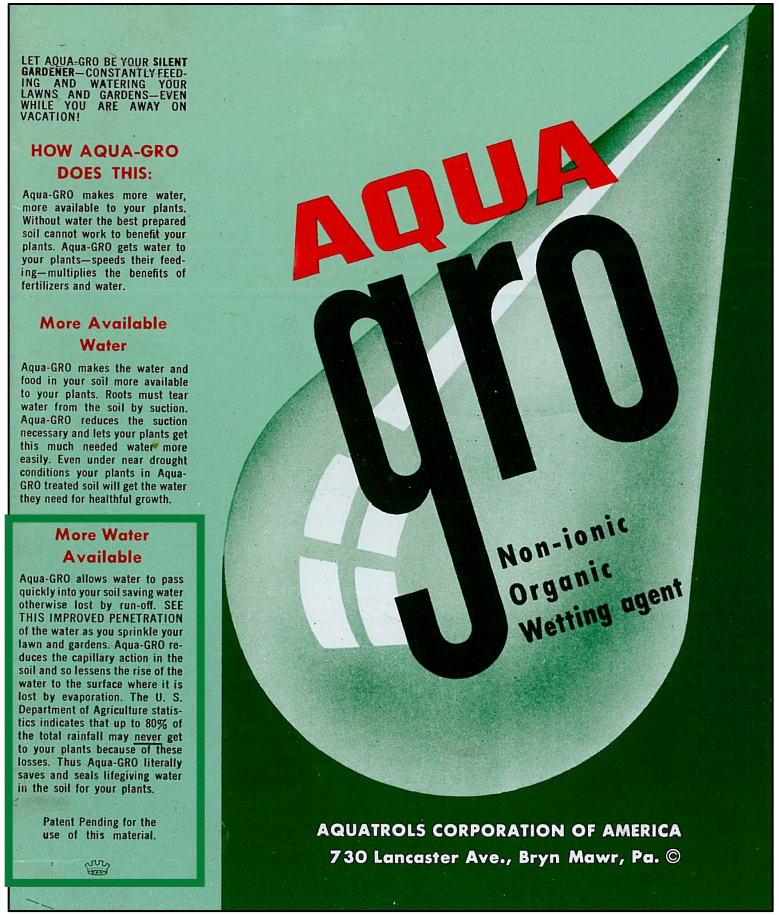
Greenkeeping career experiences

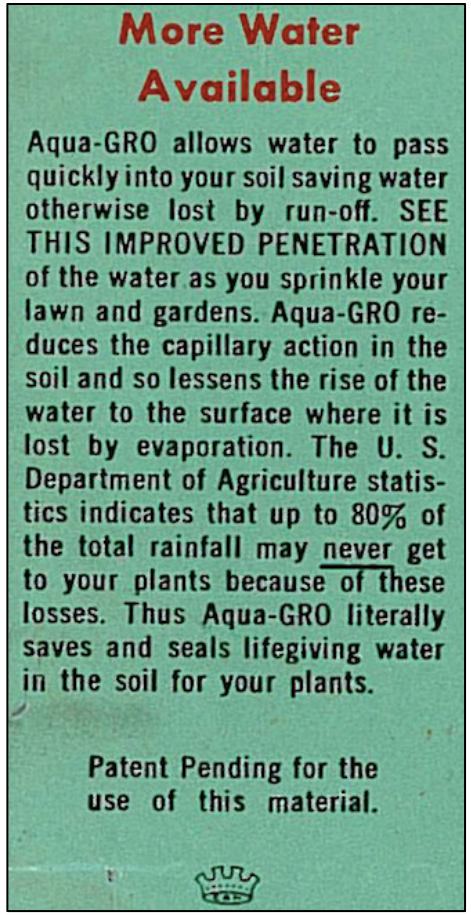
Supaturf



1985

Greenkeeping career experiences





Greenkeeping career experiences



Robert A. Moore, Vice President, Aquatrols Corporation of America, discusses important golf course applications for Aqua Gro.

Localized Dry Spots become a major problem during these hot dry summer months. I don't know how many size 14 shoes pound your turf from early morning till night, but I do know the increased traffic aggravates your maintenance of these areas. Deep and rapid watering of turf is a continuing maintenance problem. Many times areas are not uniformly watered because of Thatch, Hard Spots, Slopes and Com-

Laboratory and field tests have proven beyond doubt that Aqua Gro makes water penetrate up to twice as fast and ten times as deep. Water is no longer shed by matted or thatched areas that have been treated with Aqua Gro. Water quickly soaks into Aqua Gro treated banks and slopes. Water penetrates deeper into hard, compacted areas. By making water "wetter," Aqua Gro gives a uniform distribution of moisture throughout the soil.

Water-logging and over-wetness can often be traced to neighboring Localized Dry Spots. In endeavoring to water these areas, a temporary summer labor force often over-waters the surrounding turf. Treat these Localized Dry Spots with Aqua Gro and make watering quicker, easier, and more uniform.

Dew eliminated 'round the clock. (Read independent report, May GOLFDOM). Aqua Gro adheres to the blade of grass, and reduces the interfacial tension of the dew droplets as they form. The dew droplets can't cling to the blade, but run down the stem into the ground. Aqua Gro saves time . . . labor . . . money . . . pays its own way!

Easy to apply, Aqua Gro mixes readily with water for quick, easy application by any spray or sprinkler equipment. Aqua Gro is compatible with all agricultural chemicals, insecticides, fungicides and herbicides.

Superintendents Report After Using **AQUA-GRO**

"Wetter Water Solved Many Turf Problems"

Effects of Thatch Are Cured

Areas suffering from the effects of thatch are cured by one full treatment of Aqua-Gro. Subsequent waterings percolate freely through the thatched areas. Wet without waterlogging. Aqua-Gro is economical, one application costs approximately 75¢ per 1000 square feet.

Effects of Hard Spots Eliminated

The effects of hard spots on greens are eliminated. Treated water penetrates quickly and deeply into the soil. Uniform water penetration in soils reduces tendency to overwet areas next to hard spots.

Dew Eliminated

Periodic application of Aqua-Gro to greens prevents formation of dew 'round the clock. Fungus growth is discouraged. Costs approximately 20¢ per 1000 square feet. A considerable savings over other methods of dew removal.

Deeper Water Penetration

Plugs of earth from compacted, hard-to-wet areas prove water penetrates up to 600% greater depth if areas are treated with Aqua-Gro. More even distribution of water in the soil results in less frequent watering and better control of turf.

AQUA-GRO COMMERCIAL CONCENTRATE

5-Gallon Pail Treats 86,000 Sq. Ft. **$60.00** Freight Prepaid

Send for Report X-200 giving research data on use of Aqua-Gro

Aquatrols Corporation of America

730 Lancaster Avenue Bryn Mawr, Pennsylvania

June, 1956 13

Laboratory and field tests have proven beyond doubt that Aqua Gro makes water penetrate up to twice as fast and ten times as deep. Water is no longer shed by matted or thatched areas that have been treated with Aqua Gro. Water quickly soaks into Aqua Gro treated banks and slopes. Water penetrates deeper into hard, compacted areas. By making water "wetter," Aqua Gro gives a uniform distribution of moisture throughout the soil.

Water-logging and over-wetness can often be traced to neighboring Localized Dry Spots. In endeavoring to water these areas, a temporary summer labor force often over-waters the surrounding turf. Treat these Localized Dry Spots with Aqua Gro and make watering quicker, easier, and more uniform.

Golfdom – June 1956

Greenkeeping career experiences

Fifteen of my years in golf course maintenance were spent as a Head Greenkeeper or Course Manager

- **Channels GC: 1986 – 1990**
- **Bentley GC: 1990 – 1995**
- **Stock Brook Manor G&CC: 1995 – 2000**

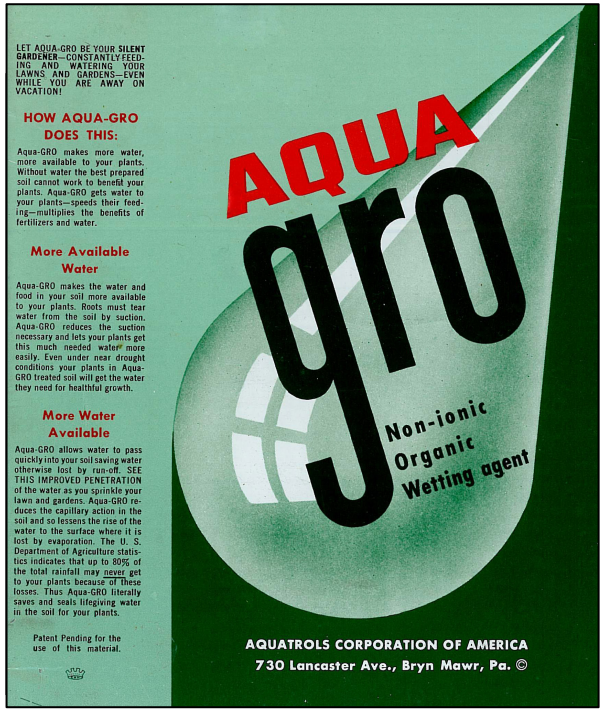
At none of these three sites did I have access to mains, borehole or river extracted water

Greenkeeping career experiences



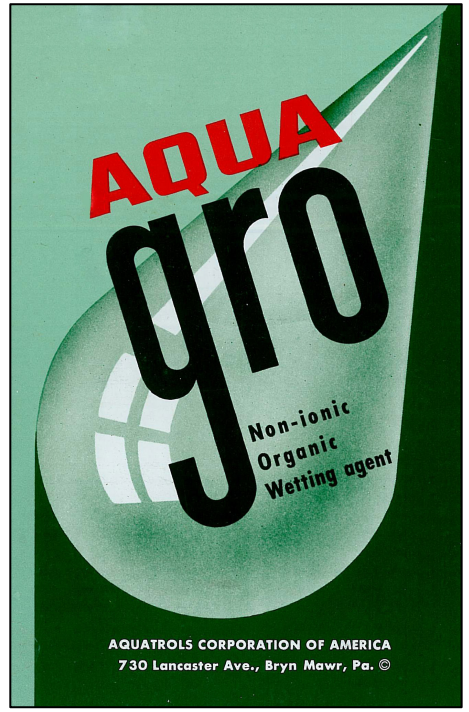


1986 - 1990



Greenkeeping career experiences





1990 - 1995

Greenkeeping career experiences

STOCK BROOK
THE COUNTRY CLUB



Aquatrols
PRIMER® 604
Matrix Flow Soil Surfactant

1995 - 2000

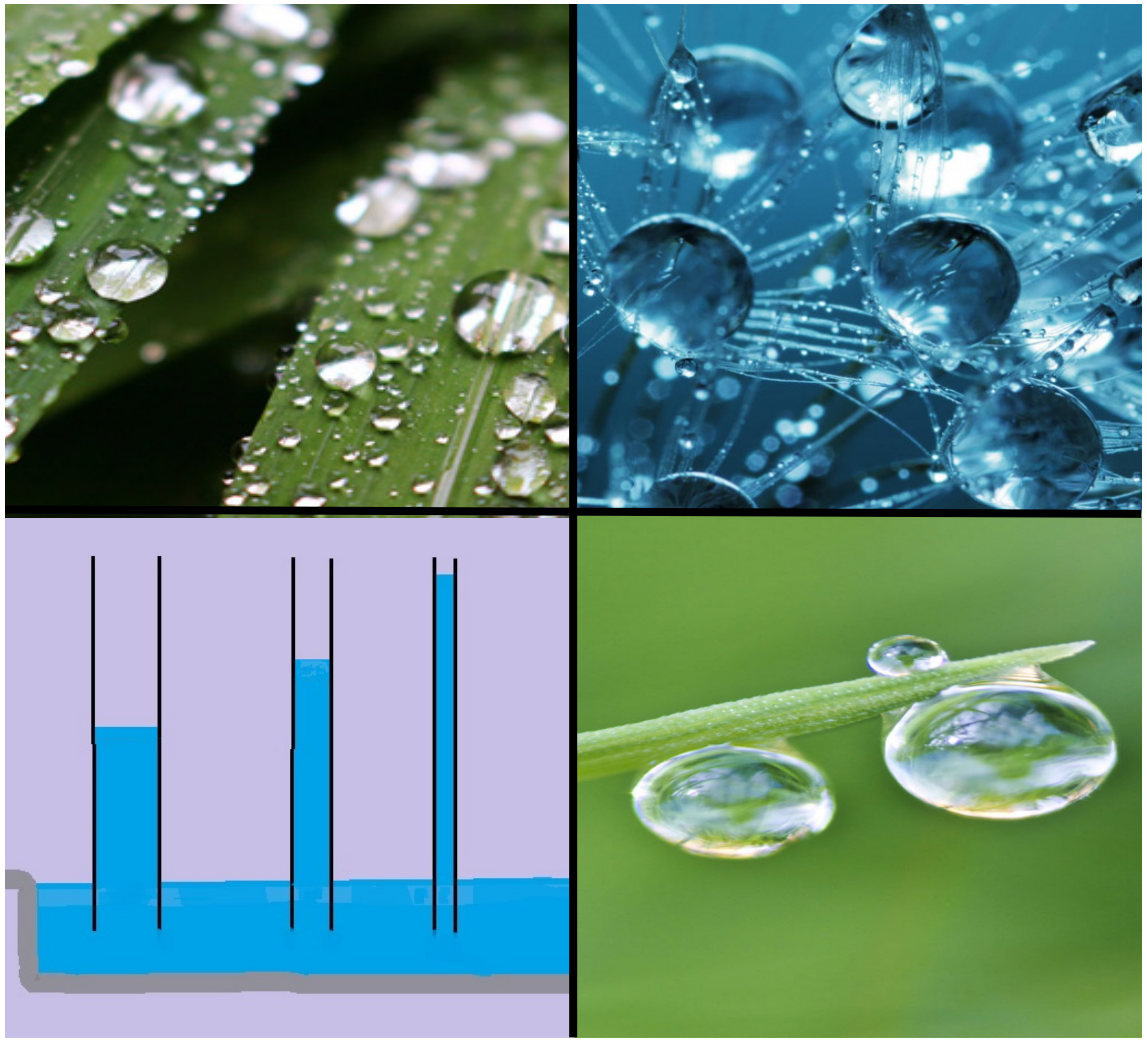
Key take home messages



Key take home messages

Adhesion:
The physical attraction between water and a solid surface

Capillary Action:
Water flowing in a narrow space without the assistance of, or even in opposition to, any external forces like gravity



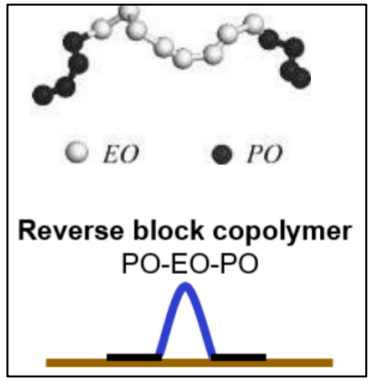
Cohesion:
The force with which one molecule of water is attracted to another molecule of water

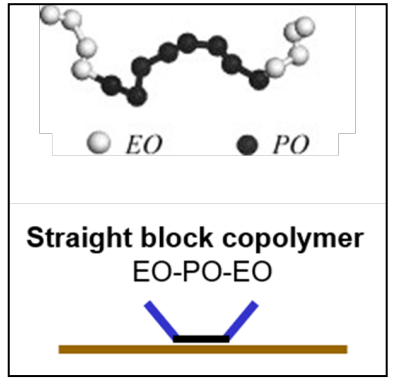
Surface Tension:
Deals with the liquid/ air interface (boundary) layer of the water droplet

Key take home messages

All wetting agents are soil surfactants…

…but not all soil surfactants are wetting agents





Key take home messages

A Danish greenkeeper carried out his own trial:

Three penetrants, six greens each, two applications three weeks apart, measurements taken using the Pogo. All products worked well under the conditions at the time (5-7% reduction in VWC)

Product X - 3.3L/Ha, lots of foam, a good watering-in required

Product Y - 10L/Ha, syringe irrigation required

Product Z - 1.75L/Ha, no irrigation required

Key take home messages

All soil surfactants affect rootzone conditions by modifying / manipulating the interaction between soil and water…

...and anything in the water

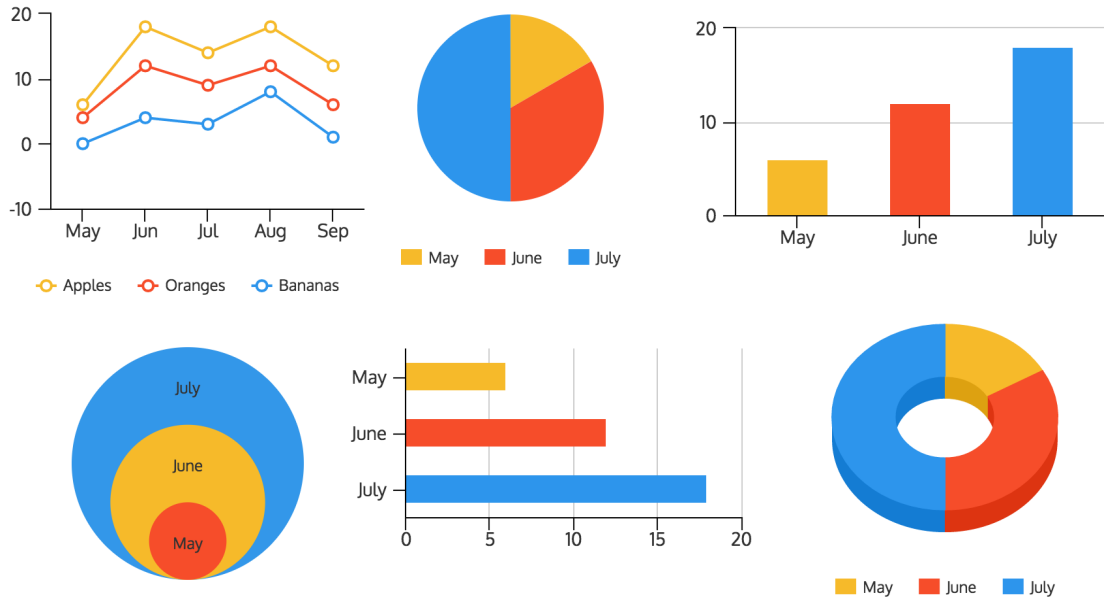


Key take home messages

Be supported by data…

…not led by data

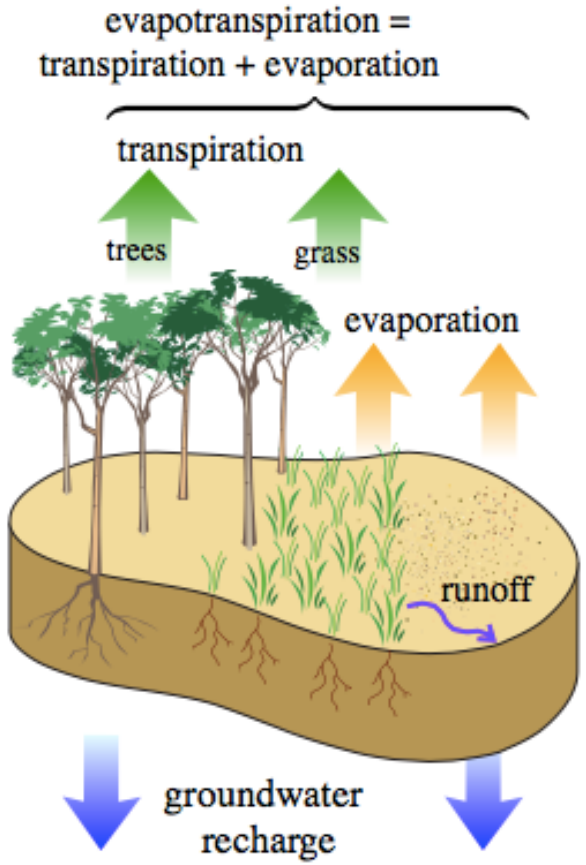
Use all your senses
(including your common sense!)



Key take home messages

Evapotranspiration rate (ET):

As one hectare has a surface of 10,000m^2 and 1mm is equal to 0.001m, a loss of 1mm of water corresponds to a loss of 10m^3 of water per hectare. In other words, 1mm ET per day is equivalent to 10m^3/Ha per day to replace



*ET replacement coefficients:

0.8 for C3 grasses and 0.6 for C4 grasses with seasonal and grass species variations to be factored in too

Key take home messages

WDPT Time (Sec)	Classification
< 5	Wettable
5 - 60	Slightly Water Repellent
60 - 600	Strongly Water Repellent
600 - 3600	Severely Water Repellent



Key take home messages

1. Place water drops at 1cm intervals along a soil core which has been allowed to dry naturally, time how long they take to move into the soil core

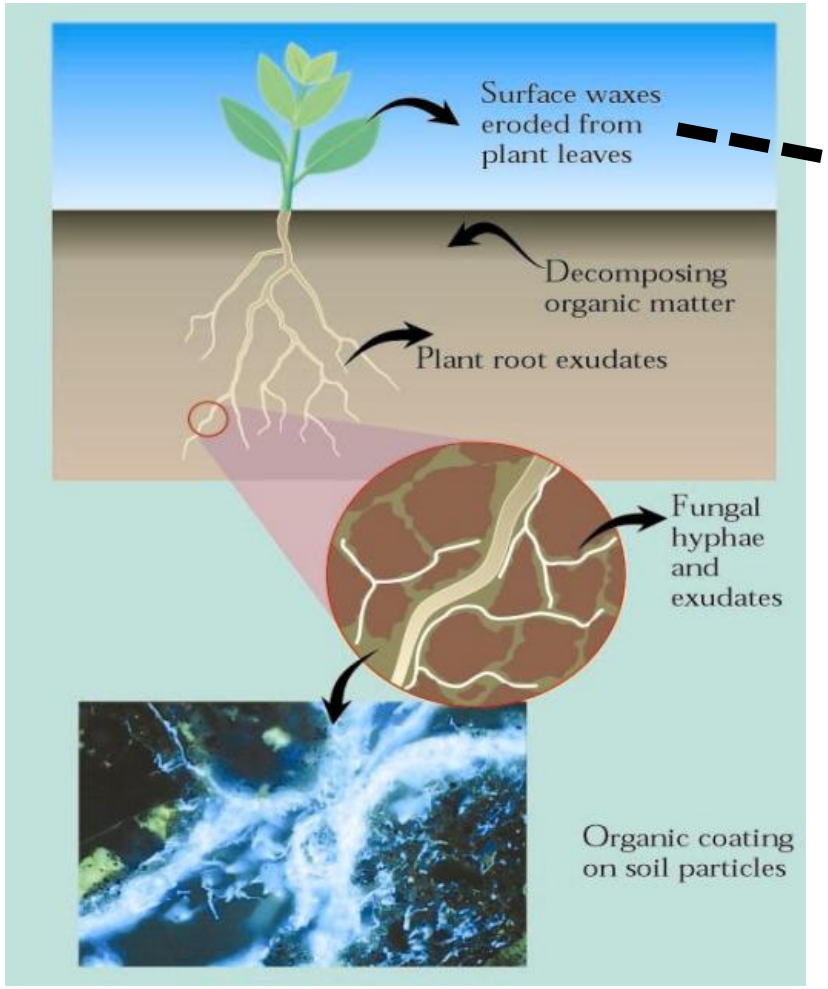
2. Severity of soil water repellency may be determined using a guideline table. The more severe the soil hydrophobicity, the more difficult soils are to re-wet which precedes poor turf quality

Key take home messages



Hydrophobicity can occur at the surface as well in the soil profile, it's important to check both

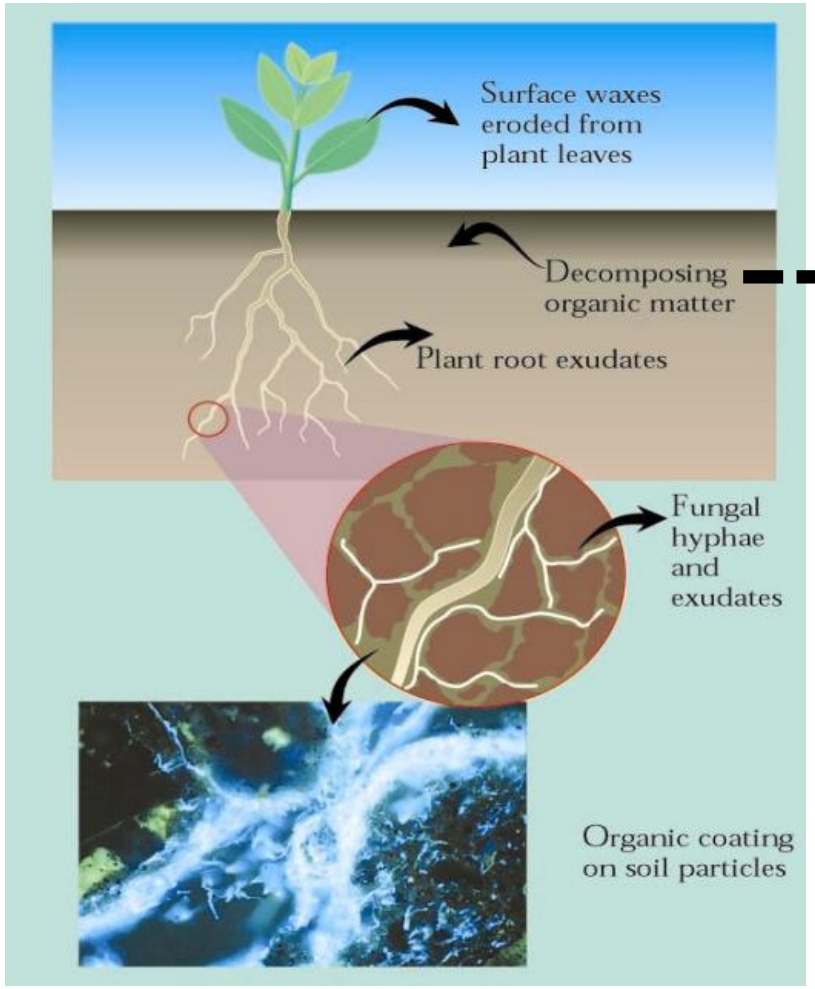
Key take home messages





Slide courtesy of Paul Hallett
University of Aberdeen

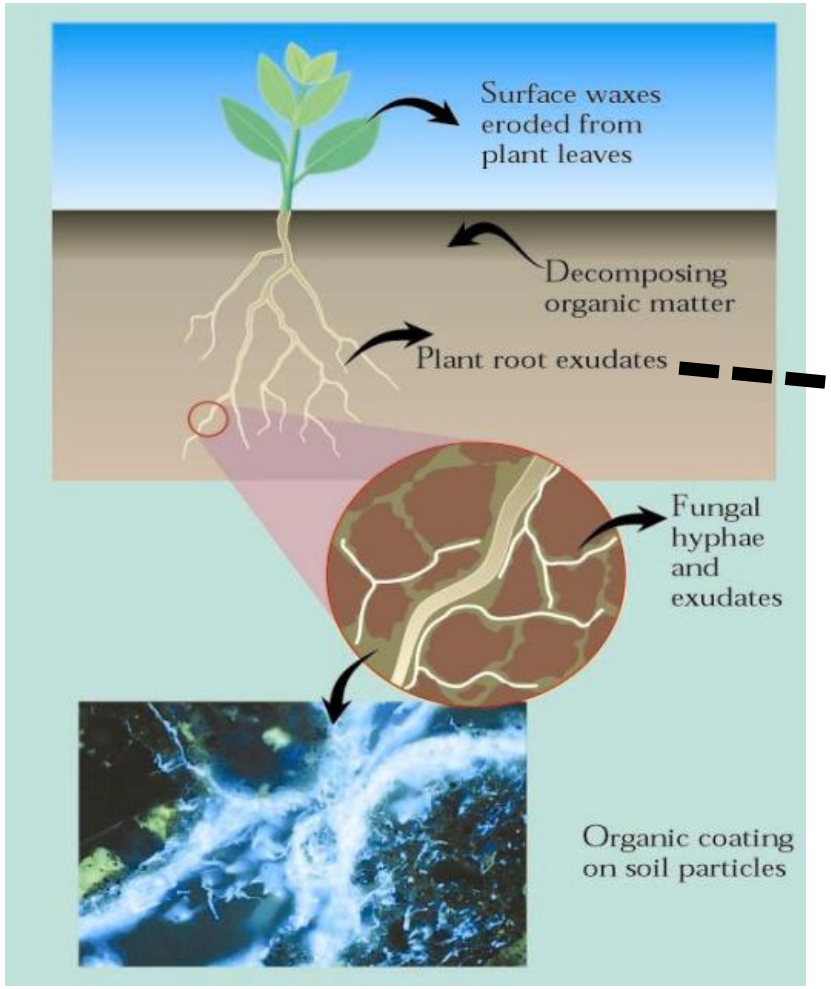
Key take home messages





Slide courtesy of Paul Hallett
University of Aberdeen

Key take home messages



Slide courtesy of Paul Hallett
University of Aberdeen

m-tyrosine

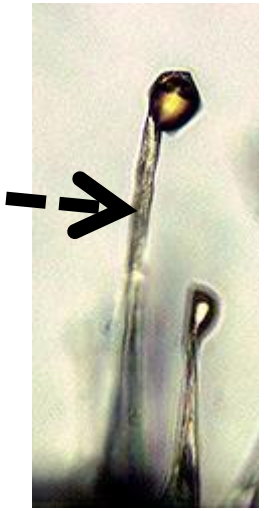
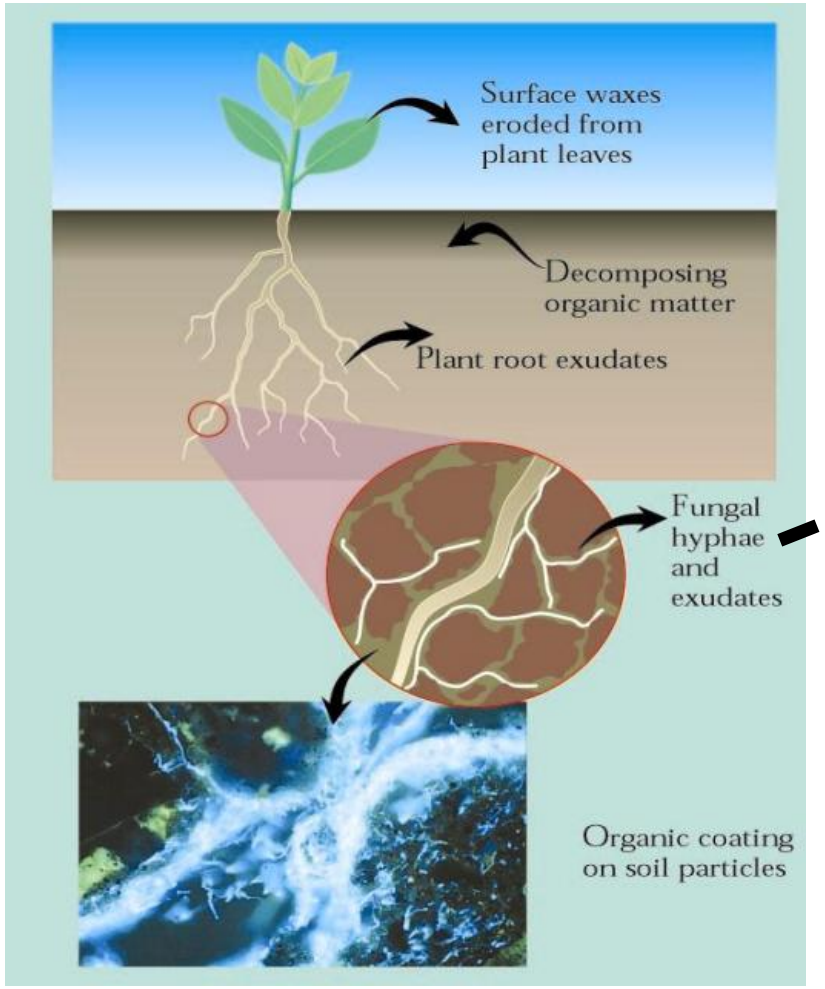


Photo credit: USDA

Key take home messages



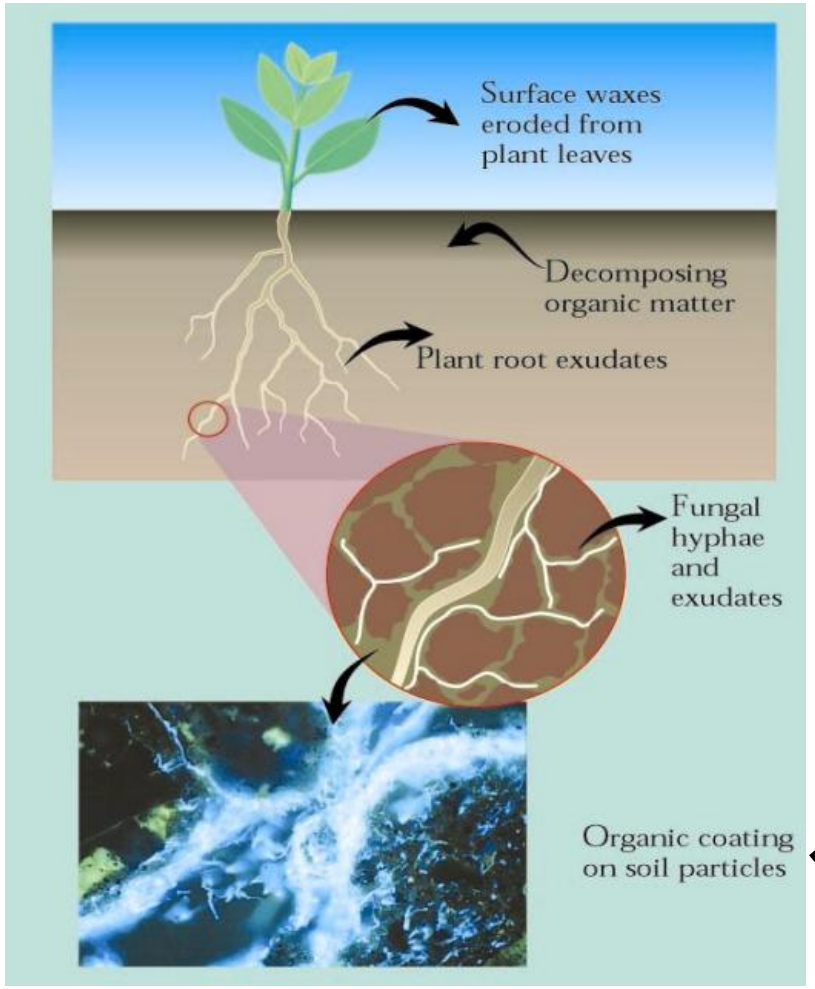
Slide courtesy of Paul Hallett
University of Aberdeen



Photo credit: M. Fidanza

PENNSTATE

Key take home messages



Slide courtesy of Paul Hallett
University of Aberdeen

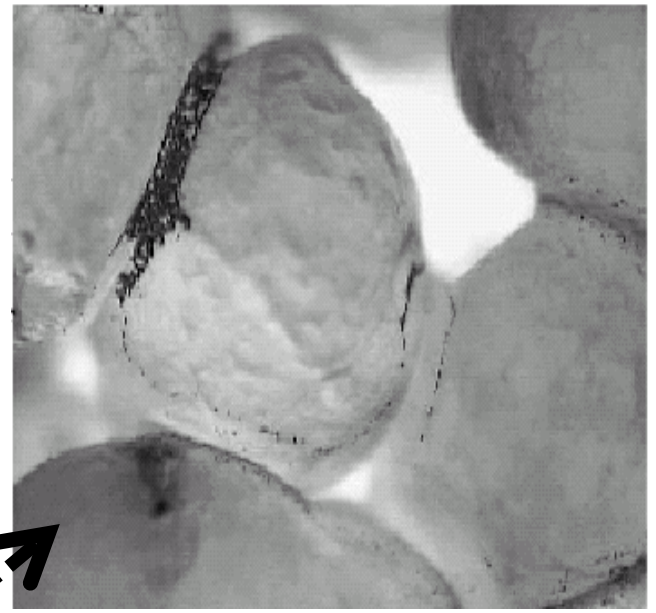


Photo credit: Tammo Steenhuis

Cornell University

Key take home messages

A soil can be rendered water repellent with just 3% of the particles being affected by repellent coatings

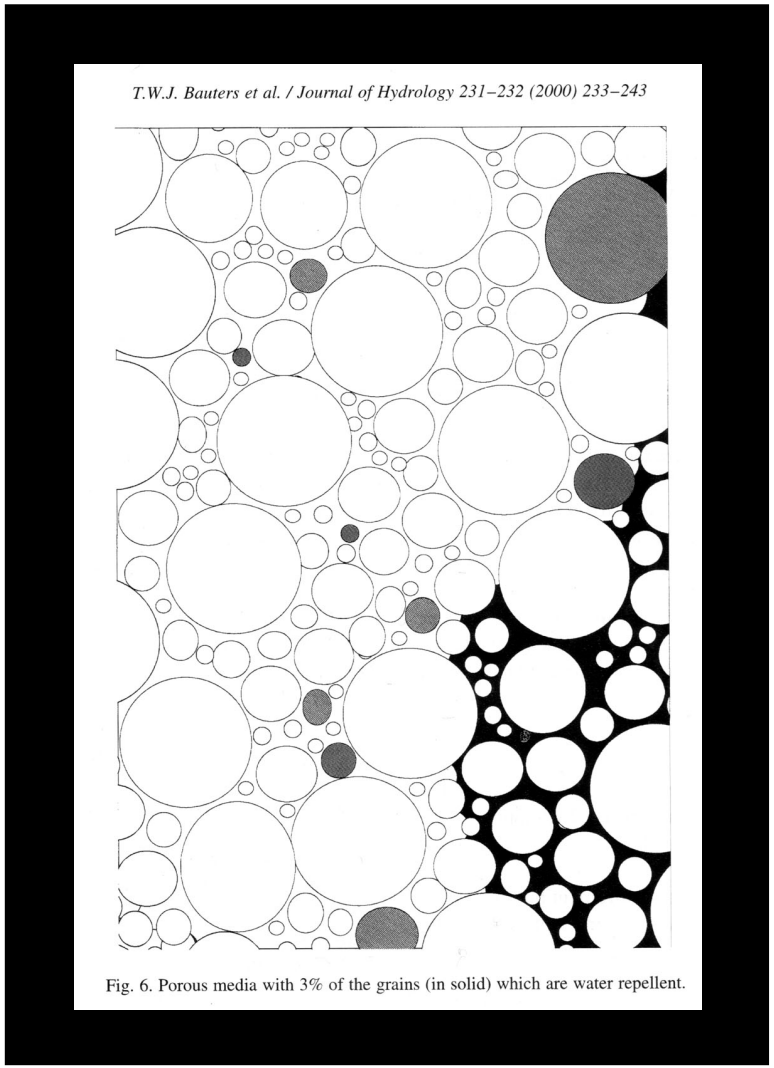


Image credit:
Tammo Steenhuis

Cornell University

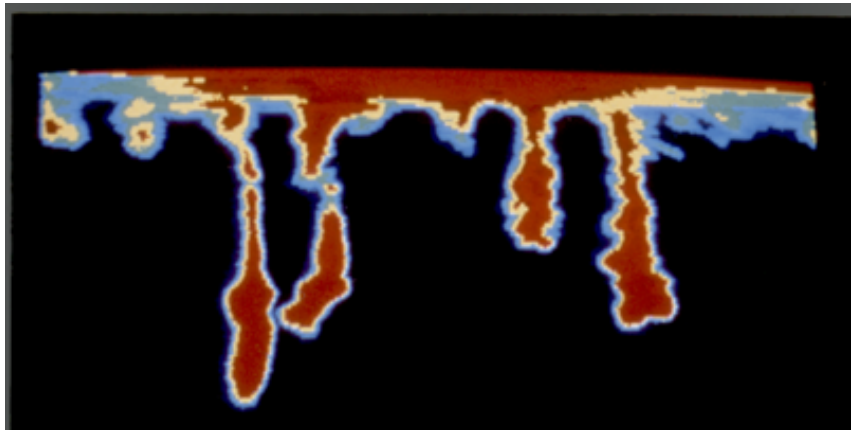
Key take home messages

Wetting front disrupted

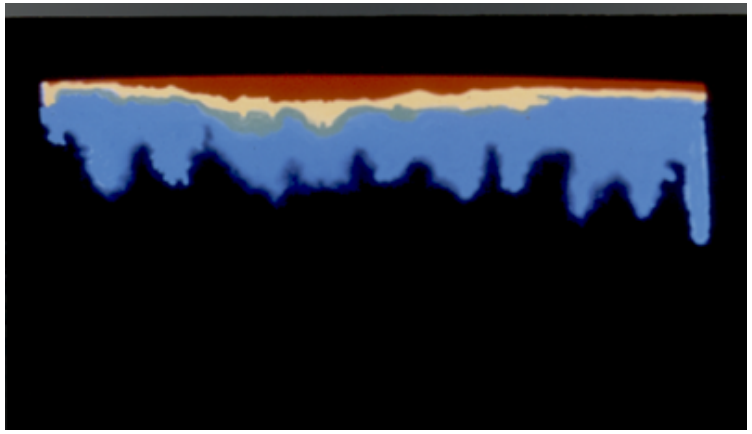
Even coating, spread and flow of water

Flow of water diverted to preferential path

Preferential flow



Matrix flow



Key take home messages

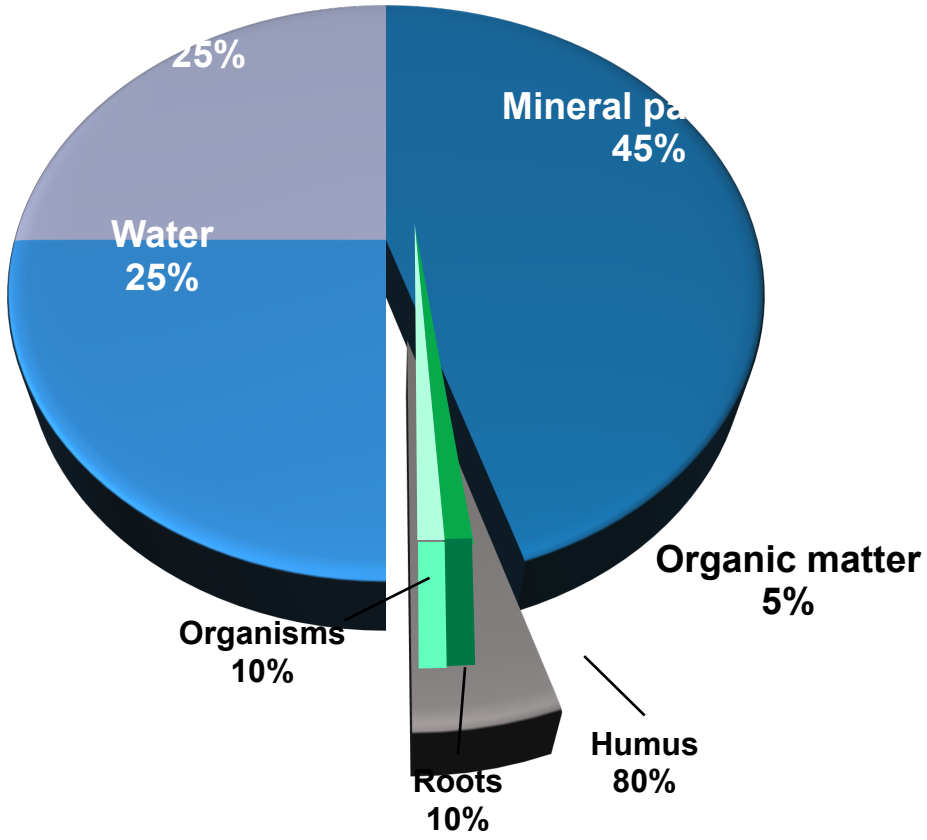


Air, water and soil in harmony

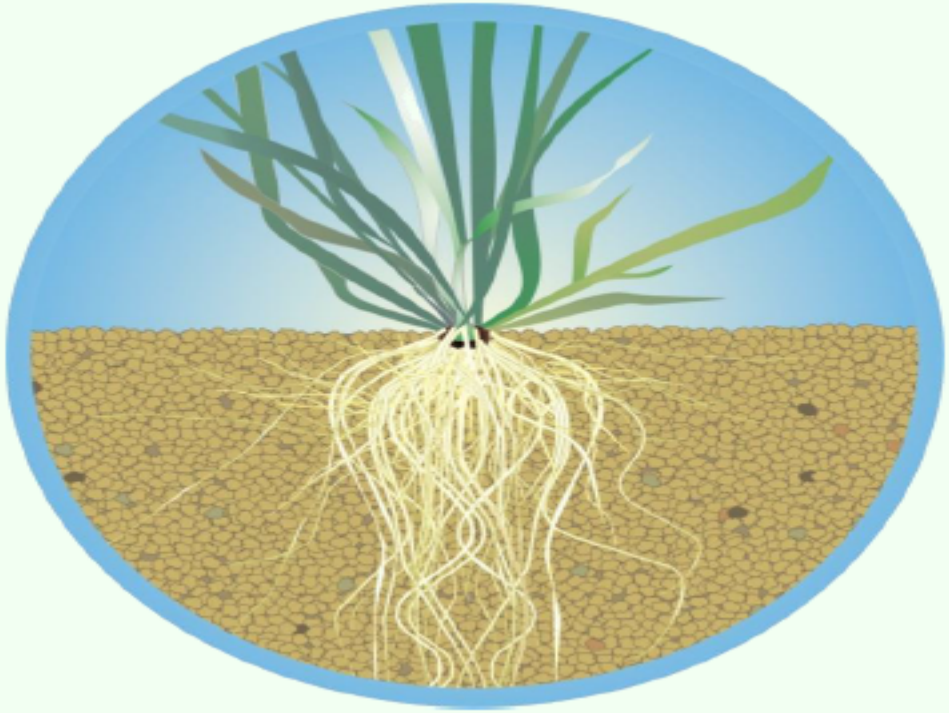
During the growing season, ideal soil moisture levels sit somewhere between Permanent Wilting Point and Field Capacity of that particular soil

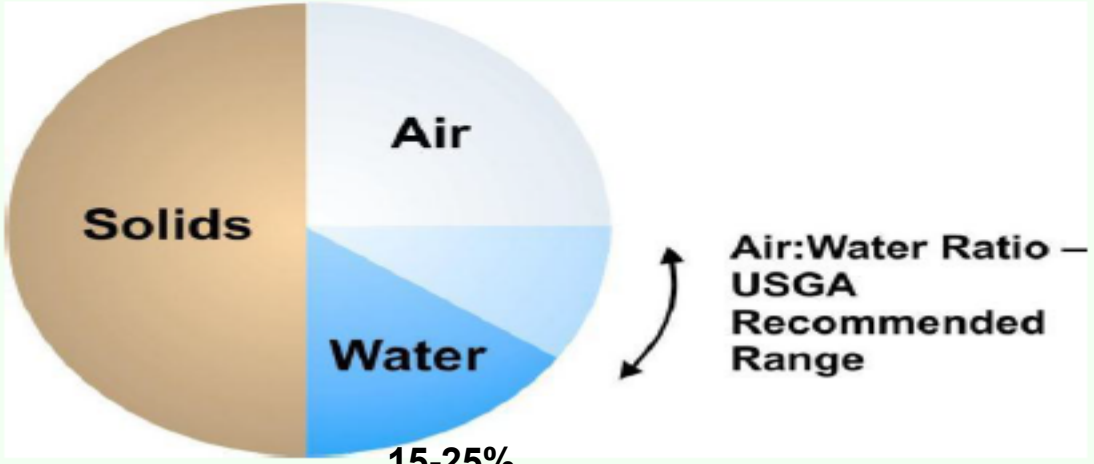
Key take home messages

Soil surfactant technologies affect these



Key take home messages





Key take home messages

- The ideal VWC varies by site, sport, performance needs, etc…
- As a general rule, take a reading at field capacity – optimum VMC is 60% of that number
- Using percentage of field capacity allows for different soil types

Average sand FC = 15-25%

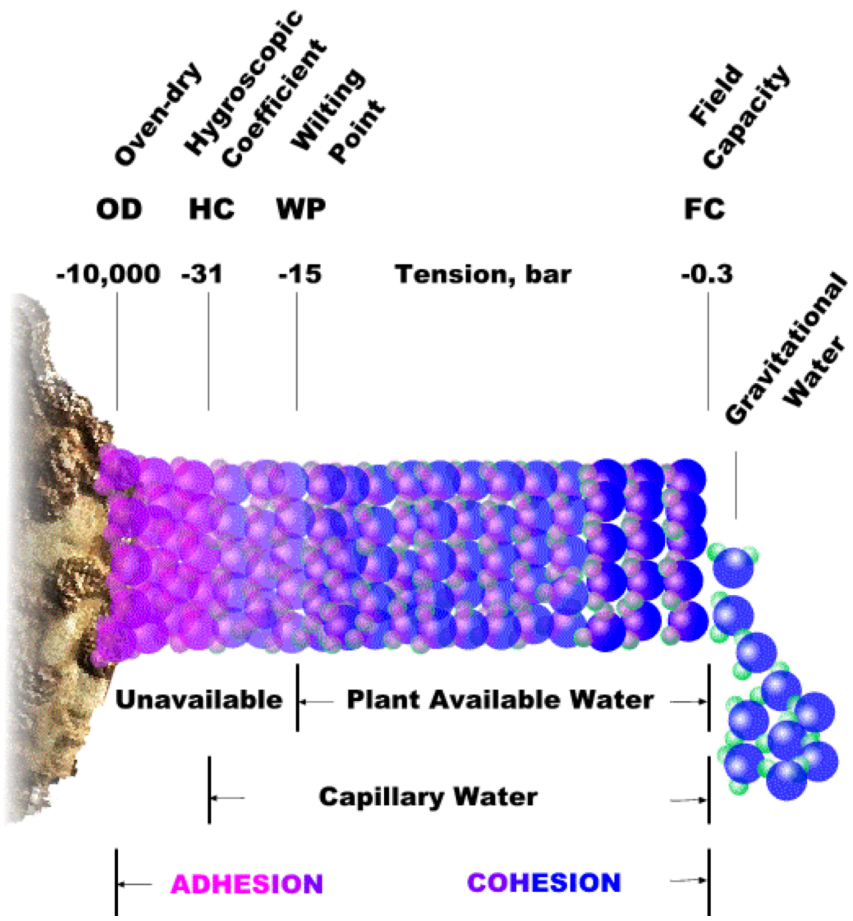
60% of 25% = 15%

Average clay FC = 45-55%

60% of 55% = 33%

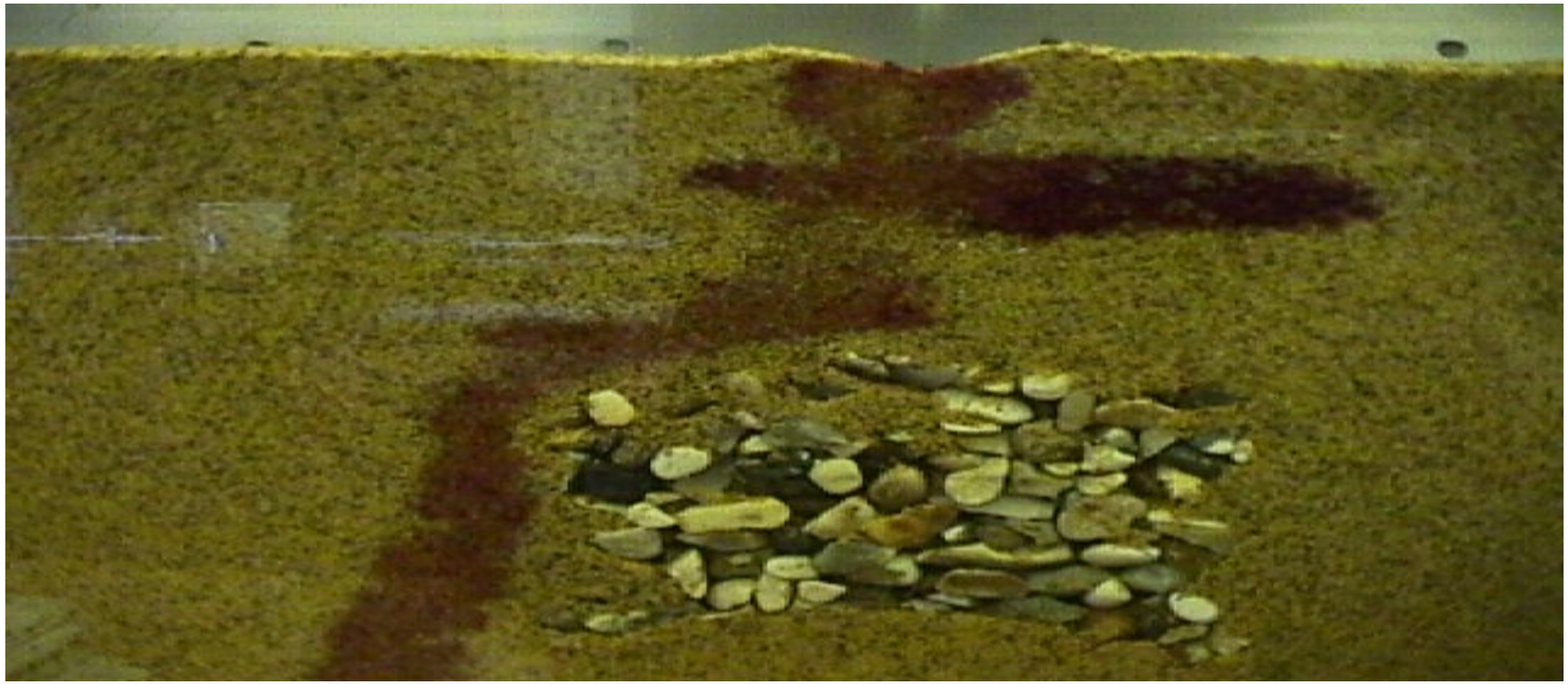
Key take home messages

Matric potential – how tightly water is held by different soil types



The battle between mineral matter, roots and gravity

Key take home messages



Water doesn’t always behave the way we expect it to!

Key take home messages



Water doesn’t always behave the way we expect it to!



Key take home messages



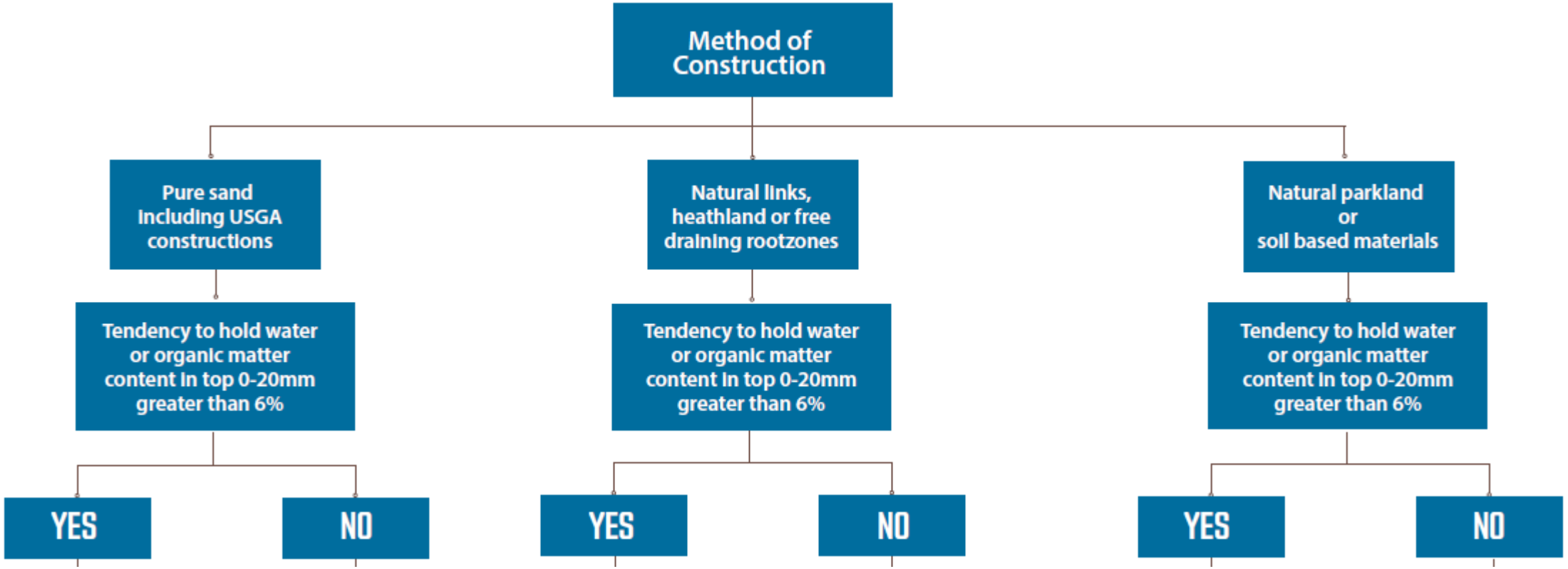
Water doesn’t always behave the way we expect it to!

Key take home messages

Five types of tank-mix including a soil surfactant:

1. **Convenience** - labour saving
2. **Positive** - net result greater than the sum of its parts
3. **Conflicting** - modes of action compromise efficacy
4. **Incompatible** - blocked filters and nozzles or worse
5. **Phytotoxic** - severe scorch or possibly loss of turf cover

Key take home messages



Key take home messages



Key take home messages

The answer to successful sports turf management doesn't come in a bottle or a bag, however the correct use of soil surfactants can assist in achieving site-specific performance goals

The key phrase being ***site-specific performance goals***

Whilst still recommending working to a programme, there is more emphasis now to make reactive decisions within the ***'Turf Action Plan'*** to help mitigate the unpredictability of the weather

Key take home messages

The answer to successful sports turf management doesn't come in a bottle or a bag, however, the correct use of soil surfactants can assist in achieving site-specific performance goals

Achieving those site-specific performance goals can result in significant improvements in both rootzone and plant health

Key take home messages



I owe my career to this couple…

…and to the many people who have helped me along the way

Questions and discussion



Tak