



# SYMBIO – The Life in Your Soil



SPORTSTURF | LANDSCAPE | WATER

# Biologically active soil

Turf managers need biologically active soil because the microbes in your rootzone perform the following functions:

- Produce enzymes to degrade and mineralise thatch
- Create humus to increase CEC and improve soil structure
- Bind soil particles together to create space for air and water
- Solubilise locked up nutrients and introduce them into the plant
- Convert plant protein and carbohydrates to plant food
- Drive the nitrogen cycle
- Make fertilisers available to the plant
- Competitively exclude turf diseases and fairy rings
- Produce antibiotics to counter disease
- Stimulate plant hormone production
- Determine the grass species you grow
- Prevent dry patch

Symbio provides the microbes that may be missing in intensively used and managed rootzones.

**Biologically Active Soils  
= Healthy Plants**



- 1 Apply or create correct soil biology
- 2 Feed the plant, balance the soil chemistry
- 3 Feed the biology
- 4 & 5 Solve any problems

Section 1 pages 6-10

## Applying Soil Biology

Explains the different products needed for each situation found in intensively managed sports turf.

Section 2 pages 11-15

## Fertilisers and Nutrition

Symbio supplies a complete range of fertilisers and trace elements for all types of sports turf. Organic, inorganic, microbially enhanced with mycorrhizae and bacteria or simple straights.

Section 3 pages 16-18

## Biostimulants - Keeping the Biology Alive

A comprehensive range of biostimulants to feed the soil microbiology and keep it alive.

Section 4 pages 19-20

## Dry Patch and Percolation Management

Chemical, organic and biological solutions to water management.

Section 5 pages 21-23

## Problem Solving with Symbio

An excellent range of products to for natural IPM programs, to rapidly repair nematode and dry patch damage, degrade oil spills and treat wash down waste.

Section 6 pages 24-26

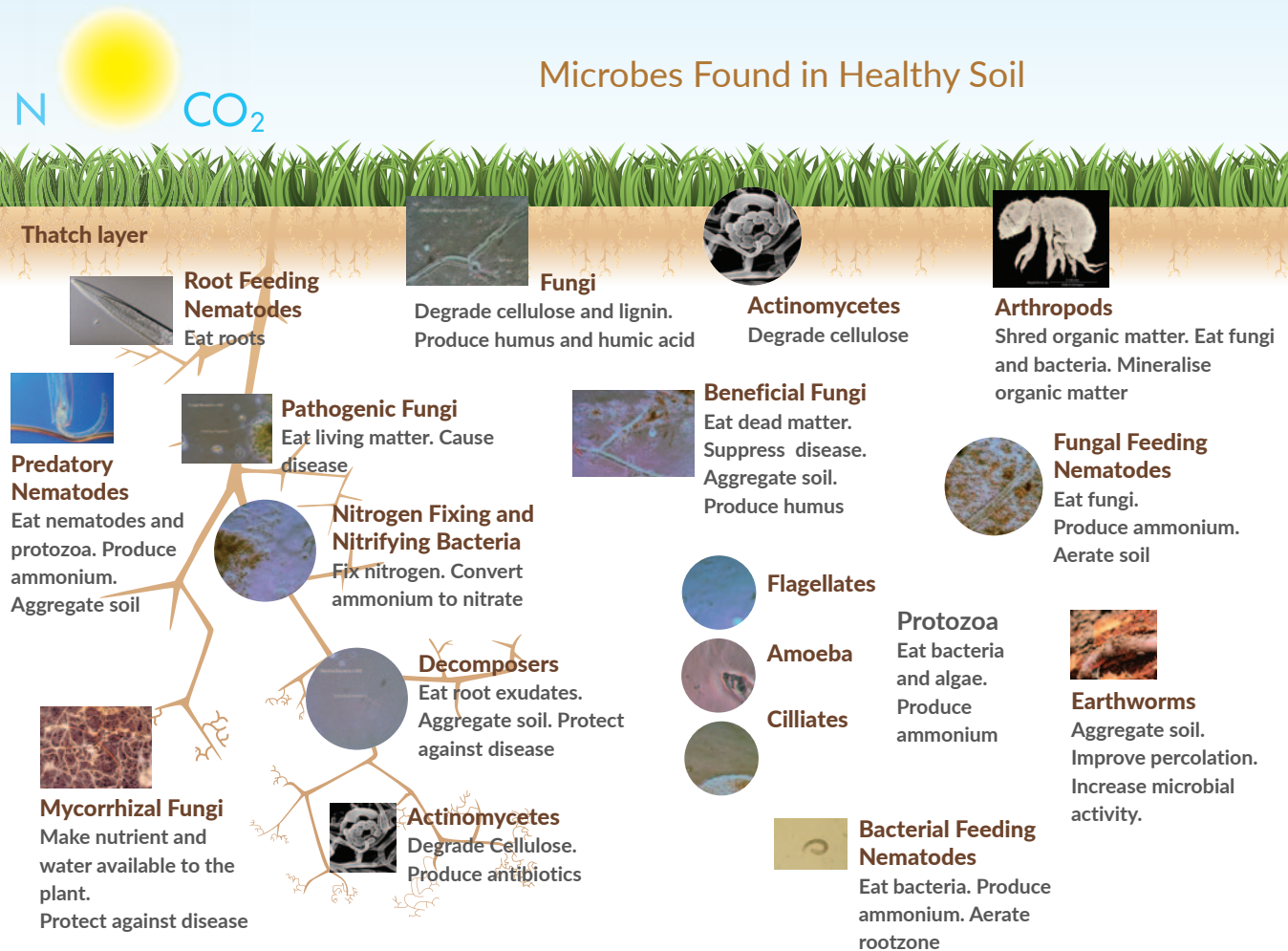
## Microbial Solutions for Easy Tree, Shrub, Lake and Pond Management

Section 7 page 27

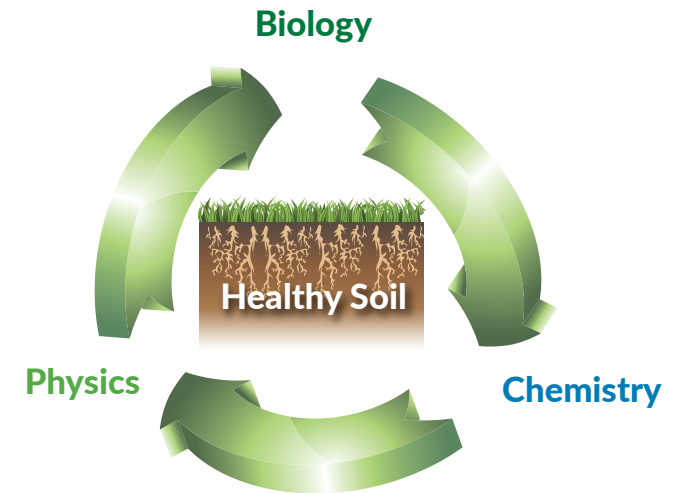
## Chemical and Biological Soil and Water Analysis

# Symbio – creating healthy rootzones for healthy plants

## Symbio creates a healthy soil food web for all grasses and plants



A healthy rootzone for healthy grass must have good biology, chemistry and physics. Biology controls the chemistry and physics.



### The Symbio Approach

1. Assess the grass species, rootzone profile and physical soil structure.
2. Analyse the chemistry and available nutrients in the rootzone.
3. Understand our customers requirements based upon the data available and preferred management practices.
4. Correct nutrient imbalances and adjust soil chemistry to bring base saturation ratios into balance and increase Cation Exchange Capacity for optimal nutrient availability and uptake.
5. Devise a programme to solve existing problems and create and maintain healthy grass and plants growing in healthy biologically active rootzones.

# Advantages of a biologically active rootzone

## Convert thatch to humus and plant food



5cm thatch layer remains after 2 years of hollow coring and 200 tonnes p.a. top dressing



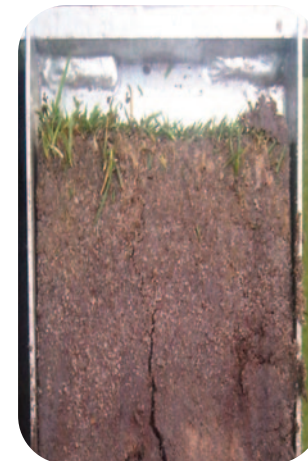
2 years after Symbio ThatchEater with hollow coring replaced by sorrel rolling and solid tining. Top dressing reduced to 120 tonnes p.a.

Pictures courtesy Bromborough Golf Club

## Reduce or eliminate the need for hollow coring and reduce top dressing



Inorganic fertilisers, hollow coring and top dressing



Symbio programme - no hollow coring

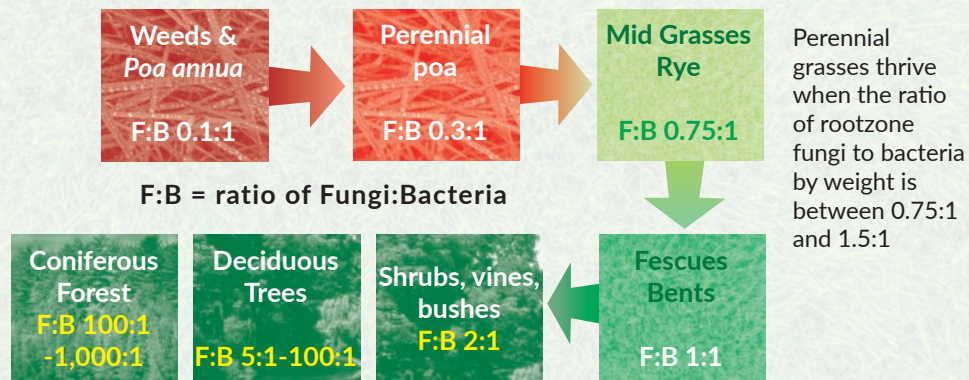
### Trial conducted by Reaseheath College

Pictures taken 9 November 2011

5 greens were managed with a conventional inorganic fertiliser programme, hollow coring 2x per year and top dressing. 5 greens were managed with a Symbio biological and nutrition programme with no hollow coring. Both were micro tined.

## Develop the correct soil biology to grow perennial grasses

### Ratio of rootzone fungi to bacteria by weight



## Other important benefits

- ✓ Improve the playing surface
- ✓ Reduce disease
- ✓ Reduce dry patch and fairy rings
- ✓ Reduce fertiliser inputs
- ✓ Reduce management costs

# Symbio Solutions for Common Problems

Problem	Causes	Symbio Solutions
<b>Too much thatch, causing soft surfaces, waterlogging and disease</b>	Thatch is degraded and converted to humus by fungi and bacteria in the presence of oxygen. If microbes or oxygen are lacking thatch builds up.	Symbio Thatch Eater or Compost Teas, fertilisers with thatch eating fungi. Oxygenate with Liquid Aeration and micro tinning.
<b>Fairy Rings</b>	Over 50 types of basidiomycete fungi cause fairy rings. They come to the surface to reproduce when there is no other bacteria and fungi to prevent their growth.	Inoculate rootzone with beneficial fungi in Compost Teas, Liquid Fungi Booster, or Symbio BioTabs and convert organic matter to humus.
<b>Fungal Dry Patch</b>	A build-up of protein and secretions delivered by fungi in the rootzone, which coat the soil particle with a hydrophobic layer.	Symbio Aquaccept contains microbes that digest the protein, plus Symbio Incision water retaining agent.
<b>Dry Patch</b>	Too much thatch or poor root development, rootzone drains too quickly or not enough water.	Symbio Incision or HydroAid Plus with appropriate solution for thatch, poor roots. Increase water retention long term with Symbio TraceOlite.
<b>Disease</b>	Weakened plants and lack of competing beneficial microbes in the rootzone, thatch and lack of oxygen.	Create a strong plant growing in healthy soil with a complete Symbio program, plus Symbio PhytoGro, Symbio Silicon, Symbio Phosphite, Symbio Defender, Symbio BioTabs.
<b>Poor germination and <i>poa annua</i> invasion</b>	Too much thatch and/or a bacterial dominant rootzone with little or no mycorrhizal fungi that support perennial grasses.	Break down thatch as above and coat perennial grass seed with Symbio Mycorrhizal SeedCoat. Create fungal dominant rootzone and apply MycoGro fertilisers to maintain mycorrhizal colonisation.
<b>Nematode damage</b>	Root eating nematodes invade the root system when there are not enough predatory and other beneficial nematodes to maintain a balanced population.	Reintroduce predatory nematodes in compost teas and encourage rapid root regrowth with Symbio Root Repair and Vermi Extract.
<b>Poor spring growth, and slow start to <i>poa annua</i> growth</b>	If temperature is warm enough for growth a lack of carbohydrate in the plant and limited nutrient uptake due to low microbial activity.	Apply CMS Shoot 5.0.2 or Symbio Caviar 10.0.4 fertilisers with Liquid Aeration and coat new seed with Mycorrhizal Seed Coat. Chelate inorganic nutrients with Symbio Fulvic Booster.
<b>Compaction, excess water retention and banding in the rootzone</b>	Lack of oxygen, humus and microbial activity to create space for air and water and assimilate locked up nutrients.	Apply Compost Teas or Vermi Extract and Liquid Aeration and micro tine to different depths.
<b>Excessive fertiliser requirement</b>	The microbes that drive the nitrogen cycle, solubilise locked up nutrients and degrade thatch are missing from the soil. Plus low CEC, humus or organic matter, or base saturation not in balance.	Correct interpretation of chemical soil analysis and balance base saturation. Apply the missing microbes from the Symbio product range and keep them alive with Symbio Biostimulants. Apply Symbio TraceOlite, or convert thatch to humus to increase CEC.
<b>Algae in ponds, lakes and irrigation water</b>	Water ecosystem out of balance due to high nutrient input or artificial construction.	Apply Symbio Blue Water
<b>New trees die or take a long time to establish</b>	Wrong type of nutrients and lack of mycorrhizal fungi.	Plant with Mycorrhizal Transplanter or Whip Dip plus Symbio Caviar 10.0.4.

# Applying Soil Biology

Symbio's Biofixation Technology Provides the Foundation for Healthy Rootzones

## SYMBIO THATCHEATER

DEGRADES THATCH WITH MINIMAL DISRUPTION - GUARANTEED

- Reduces the need for hollow coring and top dressing
- Bacteria and fungi produce enzymes to degrade thatch for a whole season with just one application
- Degrades thatch and mineralises organic matter
- Releases nutrients for sward development
- Releases food for fungi to help promote fine grasses
- Improves surface drainage and prevents black layer

Symbio ThatchEater is applied in spring, converting thatch to plant food and the humus, humic and fulvic acids that create a free draining rootzone and sustainable plant growth.

Savings made from reduced hollow coring, top dressing, fertiliser and fungicide inputs often pay for the entire thatch reduction programme.

ThatchEater is guaranteed, with a product replacement guarantee if you follow our instructions regarding aeration and nutrition and do not see a reduction in thatch density and nutrient input. To ensure success and benefit from our product replacement guarantee, please arrange a greens inspection with Symbio or an authorised distributor.

Application  
50g/m<sup>2</sup>

Pack size  
25Kg

*"I have applied thatch eater in March 2020 to better control thatch on greens. As we had the organisation of the Portugal Open in September of that same year, it was important to be able to have firm and healthy greens. The thatch eater helped us to achieve the desired results, because by being able to degrade thatch in a faster and more natural way, without disruption to the game, it allowed us to reach our goals for the Tournament."*

Emanuel Casimiro | Director de Manutenção

### Improved Formulation

Produces more lignase and cellulase enzymes to break down thatch



105 year old green showing break down of thatch and conversion to humus and plant food. The rootzone is friable and drains well. Photo taken 29th April.

## SYMBIO GREENCIRCLE

PROVIDES THE FOUNDATION FOR THE BIOLOGICAL APPROACH TO SPORTS TURF MANAGEMENT TO MAINTAIN FAST, THATCH AND STRESS-FREE GREENS

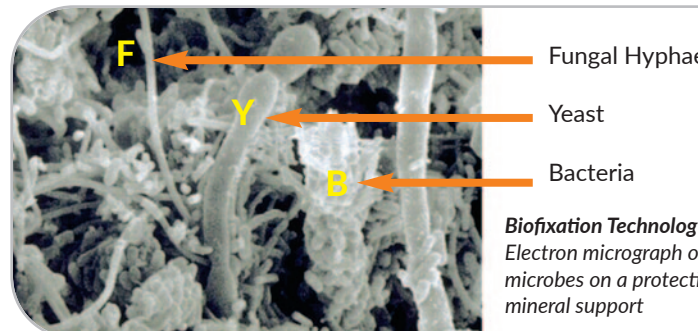
- Degrades thatch as it forms and improves plant nutrient uptake
- Promotes greater root development and sward density
- Reduces fertiliser and chemical use
- Increases turf vigour, wear and stress resistance
- Helps promote perennial grasses over *Poa annua*

One application in spring lasts for the entire growing season.

Symbio GreenCircle contains facultative aerobic bacteria and fungi that are essential to the nitrogen cycle, plant nutrition and the higher elements of the soil food web. For best results use with Symbio MycoGro Complete fertilisers.

Application  
25g/m<sup>2</sup>

Pack size  
25Kg



Biofixation Technology - Electron micrograph of microbes on a protective mineral support

### Biofixation

The process of Biofixation, the fixing of bacteria and fungi to mineral supports by chemo-osmoregulation, is at the centre of our biotechnical developments. It represents a considerable advance in the application of biotechnology and depends upon fixing selected strains of natural microorganisms to carefully chosen mineral supports. The unique combination of microbes and support gives the bacteria and fungi superior metabolic activity, toxin resistance and reproduction capacity that are substantially greater than found in free living and bio-augmented microorganisms.

“From the start of construction, we had the opportunity to grow the golf course in with a strong consideration towards sustainability. It was important for us to focus on soil biology from the outset and Symbio was the clear option. A biological management programme combined with sound greenkeeping practices is helping us deliver clean, high quality creeping bent grass surfaces”.

Callum Wark | Course Manager JCB Golf and Country club

## SYMBIO MYCORRHIZAL INOCULANT

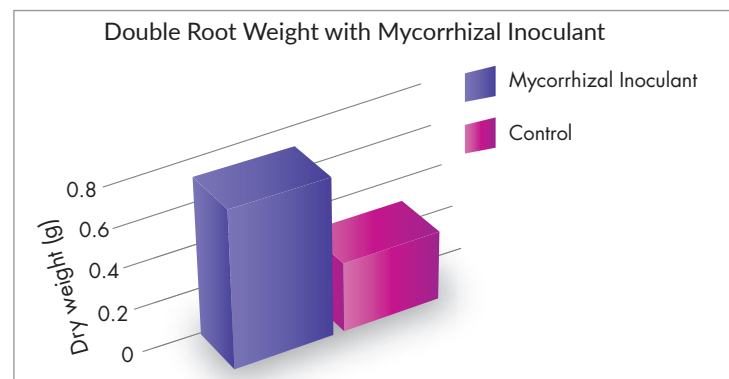
FOR RAPID DEVELOPMENT AND LOWER COST MAINTENANCE OF NEWLY SEEDED OR TURFED SPORTS TURF

- Promotes rapid establishment and longevity of perennial grasses
- May reduce grow in time by months
- Greatly improves root mass and increases nutrient uptake
- Mycorrhizal grass needs less fertiliser and water
- Degrades thatch under newly laid turf
- Mycorrhizal grass is less susceptible to and recovers faster from disease
- Restores heavily stressed or worn turf

The soil in new sand-dominated sports pitches is almost sterile. **Symbio Mycorrhizal Inoculant** contains 9 species of endo mycorrhizal fungi, growth-promoting soil fungi and bacteria, biostimulants, zeolite and soil nutrients to kick-start the soil’s natural food web.

Application  
50g/m<sup>2</sup>

Pack size  
25Kg



Trial conducted by J Shannon – Lowe University of Surrey

## SYMBIO RESISTER

FOR STRONG GROWTH AND DISEASE RESISTANCE IN AUTUMN AND WINTER

- Breaks down thatch which harbours disease-causing fungi
- Uses available nutrient for beneficial microbial and turf growth
- Promotes root development and increased winter wear resistance
- Increases turf vigour and natural plant protection
- Increases fungal populations to promote fine grass growth

**Symbio Resister** contains bacteria and fungi chosen for their ability to degrade thatch and utilise available nutrient for strong plant growth and to promote a healthy beneficial microbial population in the rootzone. Vigorous grass, efficient utilisation of nutrients and a biologically active root zone are important factors in maintaining a healthy sward that is resistant to disease, thinning, moss and other problems associated with winter play. One application will last up to 6 months.

Application  
25g/m<sup>2</sup>

Pack size  
25Kg



New golf green grown in with a Symbio programme.



“I Couldn’t be happier with Symbio products such as compost teas, liquid aeration and their fine range of bio stimulants such as fish hydrolysate, cms shoot and seaweed and the jewel in the crown mycorrhizal inoculant. Symbio in conjunction with a good aeration programme really has taken the pitch to a whole new level. An excellent range of fertilisers and service gives me a superb programme for the year, the products do exactly as they say on the tin...”

Paul Fiske  
Head Groundsman,  
Formartine United Football Club

# COMPOST TEA BREWERS

Compost tea is a highly concentrated microbial solution containing a wide range of the bacteria, fungi, protozoa and beneficial nematodes that create healthy biologically active soil in which to grow healthy plants.

Symbio's Bio Brewers suit every situation from entire golf courses and playing fields to bowling greens. Creating healthy biologically active soil with compost tea.

- Improves soil structure, oxygen diffusion, water infiltration and depth of active rootzone
- Reduces the need for hollow coring and heavy top dressing
- Retains and recycles nitrogen and other nutrients
- Rapidly decomposes thatch and turns organic matter into humus
- Produces hormones that encourage plant growth
- Reduces opportunities for pathogens to grow
- Creates the biology to promote rye, fescue and bent grass over *Poa annua*

## SYMBIO BIO BREWER 25



*Symbio Bio Brewer 25 makes 25 litres of compost tea concentrate. Ideal for bowling greens, cricket squares, soil based winter sports pitches and lawns. The Bio Brewer 25 is easy to clean and is supplied with everything needed to make microbially active compost tea.*

## SYMBIO IBC AERATOR



*Designed to fit in a 1000L IBC. Makes between 800 - 1000 litres of compost tea to treat a growing area of up to 25 hectares.*

## SYMBIO BIO BREWER 200



*The Bio Brewer 200 makes 200 litres of excellent compost tea which will cover up to 2 hectares of sand rootzones or 4 hectares of soil rootzones.*



*Compost tea converts compacted, inert soil into healthy humus rich rootzones, with improved percolation rates, nutrient recycling, disease resistance, water retention in summer and friability.*

## SYMBIO COMPOST TEA PACK

*Improved*

COMPLETE COMPOST TEA PACKAGE FOR USE WITH ALL COMPOST TEA BREWERS

The Symbio Compost Tea Pack has been specially formulated using Symbio's composting microbial technology. Each batch is tested to ensure it contains:

- Specially formulated compost with high populations of natural soil fungi and essential bacteria plus protozoa and beneficial nematodes
- A comprehensive nutrient pack containing the nutrients required for bacterial and fungal growth



Pack sizes  
**50 litres,**  
**100 litres**

(makes a minimum of 50 or 100 litres of compost tea concentrate)



“The greens at Machrihanish golf club have seen improved root mass, increased fescue dominance and very little disease. As a result, we don’t require disruptive work and are comfortable that the soil and grasses are in a sustainable healthy environment.”

Craig Barr | Course Manager, Machrihanish Golf Club

### APPLICATION and TIMING

For soils that have been subjected to heavy inorganic fertiliser and pesticide use, apply every 7 days for the first two applications and then every 3 or 4 weeks. If the sward has traditionally been subject to bad attacks of disease, increase the frequency of application just before disease usually attacks and during times when disease is usually prevalent. Compost Tea is not a pesticide but plants growing in healthy soil are less susceptible to many common diseases.

- For sand rootzones dilute 100 litres of Compost Tea in 300-750 litres of clean water per hectare.
- For soil rootzones e.g. football pitches and fairways dilute 50-100 litres of Compost Tea in 300-600 litres of water per hectare.

## SYMBIO BACTERIAL ADDITIVE FOR COMPOST TEAS

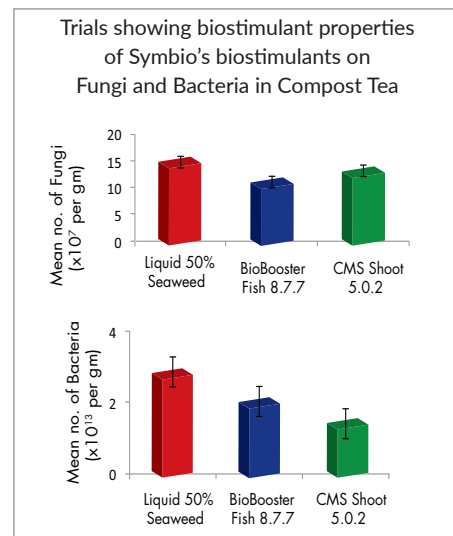
A mix of 16 species of soil bacteria concentrated at  $2 \times 10^9$  CFU per gram. The bacteria are used to boost the compost tea to stimulate growth in early spring and late autumn. If your sward is predominantly *Poa annua* that requires a bacterial dominant rootzone then Bacterial Additive may be applied throughout the growing season. Just add 250gms to your compost tea at the beginning of the brewing cycle.

Application  
**250g**  
per hectare

Pack sizes  
**250g,**  
**2.5Kg**

## SYMBIO FUNGAL ADDITIVE FOR COMPOST TEAS

This highly concentrated mix of 7 species of soil fungi is selected for its ability to degrade thatch and organic matter converting it to humus and essential organic acids. The fungi also maintain the fungal dominance needed for perennial grass growth and to help out compete the fungi that cause fairy rings and fungal dry patch. Simply add 200-500g per hectare to your compost tea at the beginning of the brewing cycle.



Sand rootzones

Application  
**500g**  
per hectare

Soil rootzones

Application  
**200g**  
per hectare

Pack sizes  
**1Kg, 5Kg**

### Sterile v Biologically Active Rootzone



Comparison of grass roots grown in sterile rootzone to grass grown with compost teas and with mycorrhizae.

(Trial performed by Josh Webber Portmore GC at Myerscough College)

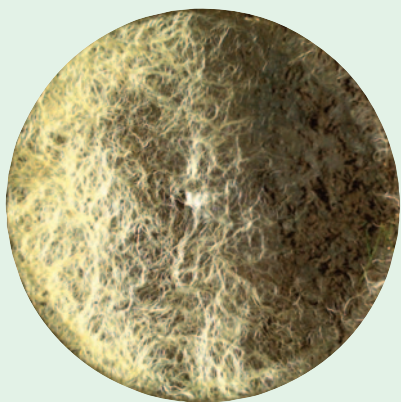
# Mycorrhizal Fungi for Grass and Seed

## What do Mycorrhizae do?

Mycorrhizal fungi expand the root system of the plant, allowing it to take up nutrients and water more efficiently.

Mycorrhizae also help fescue, bent, rye and perennial *Poa annua* species to dominate *Poa annua*.

For research and trials data, contact Symbio or log on to our website [www.symbio.co.uk](http://www.symbio.co.uk)



Roots treated with Mycorrhizal seed coat on the left, untreated on the right.

## SYMBIO MYCORRHIZAL SEEDCOAT

FOR THE RAPID ESTABLISHMENT OF PERENNIAL GRASSES

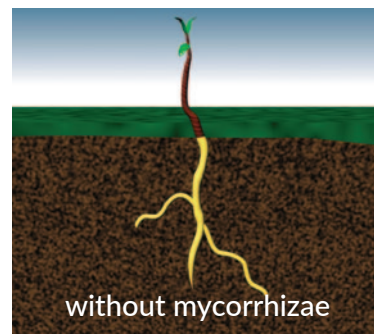
- Improves establishment of fine grass seed in new and old sward
- Increases the percentage of fine grasses in the sward over *Poa annua*
- Greatly improves root mass and increases nutrient uptake
- Mycorrhizal grasses need up to 30% less water in times of drought
- Mycorrhizal grass suffers less from disease, heat and cold stress

**Symbio Mycorrhizal SeedCoat** contains spores of 9 beneficial endo mycorrhizal fungi, plus growth promoting bacteria and fungi.

Mix 3Kg of Mycorrhizal SeedCoat per hectare with seed regardless of the amount of seed used. The aim is to achieve even coverage of the Mycorrhizal SeedCoat across the sward using the seed as a carrier.

Application  
3Kg  
per hectare

Pack sizes  
500gsm,  
1.5Kg



without mycorrhizae



with mycorrhizae

Mycorrhizal fungi extend the root systems of the plant

## SYMBIO LIQUID ENDO MYCORRHIZAL INOCULANT FOR GRASS

Apply 200 mls per hectare either as a seed coat or diluted with enough water to act as a root drench.

**Symbio Liquid Endo Mycorrhizae** contains 4 species of endo mycorrhizae. It may be applied as a seed coat, root drench, mixed with compost teas or injected into the rootzone by Ground Probe Aeration.

**DO NOT MIX** with inorganic fertilisers or pesticides. Only prepare sufficient diluted inoculant for use within 12 hours.

Application  
200ml  
per hectare

Pack sizes  
200ml,  
1 litre

# Base Saturation and CEC

## Base Saturation

The correct balance of positive alkaline (base) ions calcium magnesium, potassium, sodium and hydrogen is important for nutrient availability and soil pH. Based upon your chemical soil analysis Symbio will calculate the correct amounts of calcium, magnesium and potassium required to bring the base saturation ratios into balance. Ideally the ratio of Ca:K:Mg should be approximately 7-10:2:1.

## Cation Exchange Capacity – CEC

The Cation Exchange capacity of the soils measures the ability of the soil to hold onto the positive nutrients ions like calcium, magnesium, potassium and ammonium. Sand has almost no ability to hold onto nutrients. The two easiest ways to increase CEC is to convert thatch to humus or apply Symbio TraceOlite a mineral with an exceptionally high CEC 130-270 meq/100gm.

Simply put the higher the level of CEC and the better the base saturation balance the less fertiliser you need to apply.

## Calcium

Calcium is essential for strong plant cells and disease resistance in the plant. It is also the main component of the base cations and should make up at least 65% of the cations in the soil so the soil is kept open for air and water transfer and microbial growth. Too little calcium reduces nitrification and phosphate uptake.

**CALCIUM CARBONATE  $\text{CaCO}_3$**  – For soils with a pH <5.5

**CALCIUM SULPHATE  $\text{CaSO}_4$**  (Gypsum) – For soils with a pH >5.5

Both products are greens grade granules 1-1.5mm applied by fertiliser spreader into tine holes.

In spring or early summer, mix with top dressing or apply by itself – brush into tine holes after aeration.

Application  
50-100g/m<sup>2</sup>

Pack size  
25Kg

## Magnesium

Correct magnesium levels are needed for quality rootzones and efficient nutrient uptake. Magnesium should comprise at least 5% and up to 10% of the base cations in the soil.

**KIESERITE 16% MgO**

Kieserite, a greens grade granule 1-1.5mm, is the most effective way to manage magnesium shortfall.

At any time of year. Mix with top dressing or apply by itself – brush into tine holes after aeration.

Application  
25-50g/m<sup>2</sup>

Pack size  
25Kg

## SYMBIO TRACEOLITE

A long lasting mineral, **TraceOlite** is a natural zeolite, packed with trace elements, with unique physical, chemical and cationic exchange properties. (130 - 270 meq/100gm).

- Boosts cation exchange capacity (CEC), re-mineralises poor soil
- Holds over 40% of its weight in water
- Prevents water logging, hardens soft playing surfaces, extends winter play
- Dramatically reduces fertiliser leaching and chemical run off
- Reduces grow in time and maintenance costs of new constructions

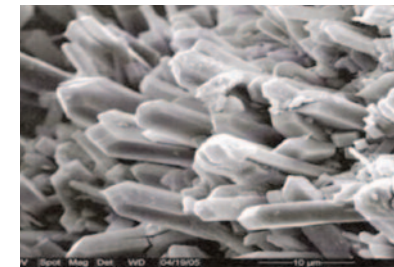
To increase Cation Exchange Capacity.

Application  
1-10 tonnes per hectare

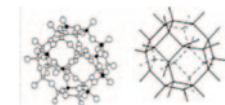
To firm and dry wet playing surfaces. Either via tine holes or mixed with top dressing.

Pack sizes  
25Kg,  
1,000Kg

Application  
2-10 tonnes per hectare



TraceOlite's three dimensional lattice allows for a very high cation exchange and water holding capacity



Zeolite (Phillipsite) showing massive internal surface area under an electron microscope

# Fertilisers and Nutrition

Symbio reduces fertiliser inputs by adding mycorrhizal fungi and soil bacteria and fungi to its fertilisers to use the nutrients produced by nature and the nutrients locked up in the rootzone.

Natural grasses get their nutrient from root exudates containing protein and carbohydrate, thatch degradation, organic matter, excreted nitrogen and phosphate in animal waste and in smaller amounts from rainfall and nitrogen fixation.

Bacteria and mycorrhizal fungi also solubilise essential nutrients, such as phosphate and magnesium, locked up in the soil and make them available to the plant.

## Easy to spread fertilisers with mycorrhizal fungi, soil fungi, bacteria, zeolite and seaweed meal

- Promotes the establishment of fescue, bent and rye grasses
- Mycorrhizae improve root mass and increase nutrient and water uptake
- Increases plant tolerance to drought and stress conditions
- Faster grow-in and establishment of new grass seeds and turf
- Healthy grass growing in a microbially active root zone suffers less and recovers faster from disease

## SYMBIO MYCOGRO COMPLETE BIOLOGICAL FERTILISERS

WITH MYCORRHIZAE, FUNGI AND BACTERIA

SPRING and SUMMER

- Symbio MycoGro 10.0.0 + 6% Mg
- Symbio MycoGro 11.0.11 + 4% Mg
- Symbio MycoGro 10.0.20 + 1.7% Fe + 2.2% Mg
- Symbio MycoGro 11.2.14 + 3% Mg + slow release methylene urea

All with trace elements.

AUTUMN, WINTER and SPRING

- Symbio MycoGro 5.0.28 + 2.5% Fe + 1.5% Mg
- Symbio MycoGro 10.3.14 + 2% Mg 2% Fe (without mycorrhizae).

Application  
25-35g/m<sup>2</sup>

Pack size  
20Kg

MycoGro Complete Biological fertilisers contain readily available inorganic nutrients. See product data sheets for the nutrient sources within each fertiliser.

## SYMBIO LIQUID FERTILISERS

Easy to apply, readily available nutrients for all heavily used sports turf.

20.0.10 available with seaweed and humic acid.

In 400-600 litres of water.

Application  
20-100  
litres per  
hectare

Pack sizes  
20 litres,  
200 litres

# Trace Elements and Micro Nutrients



Parameters	1ST OLD	1ST NEW	3RD OLD	17TH NEW	500 1.200
Parameters Exchangeable	422.9	381.0	654.8	548.5	86 120
Calcium ppm	83.0	120.1	368.0	122.1	82 48
Potassium ppm	12.8	42.6	61.1	37.9	30 45
Magnesium ppm	12.3	37.6	19.0	14.5	9.30
Sodium ppm	11.0	20.6	15.8	16.0	5 11
Chloride ppm	290.3	414.3	381.0	300.1	20 40
Phosphorus ppm	50.0	70.0	8.1	3.6	6 8
Sulfur ppm	1.2	1.1	1.2	0.8	2 5
Nitrogen ppm	2.9	1.1	4.7	4.8	3 8
Copper ppm	0.5	0.5	0.4	0.0	0.7 1
Zinc ppm					
Boron ppm					
Iron ppm	1.00	6.00	7.00	6.00	1 11

## SYMBIO CHELATED IRON

Symbio Chelated Iron is an EDTA liquid formulation, rapidly assimilated by the plant to promote a very swift 'green-up' response.

Symbio Chelated Iron 6% Fe also hardens the grass against wear. The chelated formulae ensures the product is translocated into the plant effectively and prevents the binding and 'lock-up' in the soil profile with other elements.

Apply in 400-600 litres of water.

Application  
20 litres  
per hectare

Pack size  
20 litres

## SYMBIO 50/50 SOLUBLE IRON

Symbio 50/50 Soluble Iron can be used all year round, irrigate after application of the product.

Diluted in 600-800 litres of water.

Application  
25Kg  
per hectare

Pack size  
10Kg

## SYMBIO TRACE ELEMENTS

Symbio Liquid Trace Elements are used in times of stress when a rapid and effective balance of the plants trace elements may be required. Symbio's liquid formulations may be used by themselves or to top up any liquid fertiliser to ensure the correct nutrients are applied for your sward.

- Foliar application for immediate effect
- Used in times of stress to re-balance the trace elements within a plant
- Can be used alone or as an addition to a fertiliser program

All Liquid Trace Elements may be tank mixed with each other, liquid fertilisers and biostimulants.

When growth in cool, wet weather is needed apply with Symbio Fulvic Booster for best results.

Application  
3 litres  
per hectare

Pack size  
10 litres

### Liquid Trace Elements 10 litres

Nutrient:	% w/v
Boron (B)	0.7
Copper (Cu)	0.4
Iron (Fe) chelated by EDTA	3.4
Manganese (Mn)	2.1
Molybdenum (Mo)	0.2
Zinc (Zn)	0.6

### MAGNESIUM 5% Mg

is a core component of the chlorophyll molecule and is necessary for the synthesis of amino acids, vitamins, oils and sugars.

### CALCIUM 6% Ca

plays a major role in the development of plant and fruit cell walls, especially during cell division. It also protects cells from toxins and in slowing the aging process.

### COPPER 6% Cu

is essential for chlorophyll production and the correct operation of photosynthesis. It also acts as an enzyme activator. Deficient turf has stunted withered leaves with often a dark blue green colour, and dead or brown spots.

### MANGANESE 6% Mn

is used by the plant in the formation of various enzymes. It has a major role in chlorophyll synthesis and nitrogen metabolism.

### ZINC 6% Zn

is essential for protein synthesis, seed and grain formation, enzyme systems, plant maturity and growth regulation.

### BORON 15% B

is directly involved in the translocation of sugars from the leaf to the roots. Half of these sugars are exuded into the root zone to feed beneficial micro-organisms, i.e. boron has a direct biological link.

# Cool Season Fertilisers and Carbohydrate Biostimulants

*"Having seen the benefits of a Symbio programme at my previous club, Tadmarton Heath, I was keen to show Kilmacolm the results they gained. So far we are delighted with progress and look forward to more seasons with Symbio."*

Jim McMurdo | Course Manager, Kilmacolm Golf Club

## SYMBIO CMS SHOOT

FOR THE EARLIEST START TO SPRING GROWTH

Symbio CMS Shoot is made from molasses by amino acid fermentation to retain proteins and nutrients, it is a rapidly available source of carbohydrates and amino acids to boost the plants resources for strong, healthy growth.

- Stimulates soil biology for early spring root and shoot growth
- Rapid assimilation of nutrient through roots and shoots
- Stimulates photosynthesis and carbohydrate production
- Improves seed germination and survival
- Improves growth in shady conditions
- The most economic source of carbohydrates available
- Year round fertiliser for sports pitches and outfields

As a biostimulant for golf greens and other grass swards.

Application  
10-20 litres  
per hectare

Apply in 400-600 litres of water.

As a total fertiliser for greens, pitches, fairways and lawns.

Application  
30-50 litres  
per hectare

### NUTRIENT CONTENT

Total Nitrogen 4%, Ammoniacal N 1.6%, Potassium (K<sub>2</sub>O) 4%, Amino Acid content 14%, Humic Acid content 2% in concentrated molasses. Specific gravity 1.26.

Pack sizes  
20 litres,  
200 litres

Pack sizes  
750 litres,  
1,000 litres



Cricket square renovation with Symbio Mycorrhizal SeedCoat and Symbio Caviar 10.0.4

## SYMBIO CAVIAR 10.0.4 ORGANIC FERTILISER FOR FAIRWAYS, SPORTS PITCHES and AMENITY GRASS

An easy to spread 10-0-4 low salt index organic granule combining slow release nutrients, containing organic matter (derived from molasses), with humic and amino acids, providing excellent biostimulant and soil building properties.

- For dense rapid growth especially in shade and cool weather
- Improves the friability of heavy and clay soils
- Improves soil structure and water infiltration
- Place under newly laid turf for rapid root establishment, even in winter
- Ideal for stadium pitches and grass in shade

### CONTAINS

Total Nitrogen	10%
Ammoniacal N	5%
Potassium (K <sub>2</sub> O)	4%
Total organic carbon	20%
Organic matter (Volatile Solids, VS)	64%
Humic Acids by acid precipitation	5%
Amino Acids	36%

Application  
30-50g/m<sup>2</sup>

Pack sizes  
20Kg,  
500Kg

Before



2 weeks later after seeding and applying Symbio Caviar 10.0.4



# Biostimulants – Keeping the Biology Alive

## SYMBIO FULVIC BOOSTER

COOL SEASON GROWTH PROMOTER  
AND CHELATING AGENT

Extend the growing season with Fulvic Booster. The best way to encourage early spring and late autumn growth.

**Symbio Fulvic Booster** is a concentrated 30% fulvic acid solution with humic acids and trace elements.

- Promotes early and late season and shaded growth
- Reduces drought stress and transpiration
- Powerful chelating agent when mixed with liquid fertilisers, trace elements and fungicides
- Thickens plant cell walls to improve cut and roll

As a chelating agent and summer biostimulant

Application  
2.5-5 litres  
per hectare

To promote early and late season growth

Application  
10 litres  
per hectare

In 200-600 litres of water.

To chelate liquid fertilisers and improve fungicide uptake, 5 litres per hectare. To mix with organic fertilisers and compost teas, 2.5 litres per hectare.

Pack size  
10 litres

Also available as a soluble powder at 80% concentration

Pack size  
5Kg

## SYMBIO LIQUID 50% SEAWEED

CONCENTRATED 50% SOLID MATTER

A super concentrated Liquid Seaweed, rich in growth hormones, laminarin, fucoidan and trace elements. Made from *Ascophyllum nodosum*.

- Promotes stress-resistant, healthy plants
- Promotes the growth of fungi in your soil to help encourage fine grass growth
- Increases soil fertility
- Strong antioxidant

**Laminarin and fucoidan** – boost the plant's defence mechanisms against stress and disease and stimulate germination.

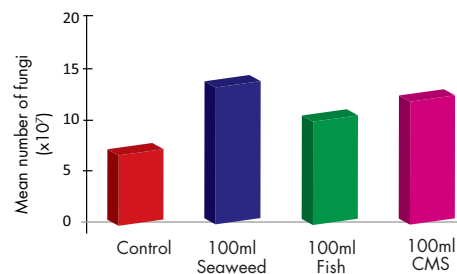
**Growth Hormones** – Cytokinins, auxins, gibberellins and betaines help the plant reach its genetic potential.

In 400-800 litres of water.

Contains – N, P, K, CaO, MgO, SO<sub>4</sub>, Mn, Cu, Fe

Pack size  
10 litres

Application  
10-20 litres  
per hectare



The positive effect of Symbio biostimulants on fungi in compost tea

Trial conducted by G. Giadina. University of Surrey

## SYMBIO BIOBOOSTER N 26.0.0

Symbio BioBooster N 26.0.0 contains 26% w/w nitrogen.

- Combined fast and slow release nitrogen source 26.0.0
- Methylene Di-Urea low salt index fertiliser
- Provides sustained 'Green-up' lasts 4-8 weeks
- Low salt index promotes beneficial soil microorganisms

May be tank mixed with compost teas and biostimulants.

Symbio BioBooster N 26.0.0 promotes healthier and longer lasting plant root and shoot growth and microbial growth.

Application  
20-50 litres  
per hectare

As a foliar or soil drench during the growing season.

In 300-600 litres of water.

Pack size  
20 litres

## SYMBIO HUMIC BOOSTER

FUNGAL BIOSTIMULANT

### Apply throughout the growing season

Increases beneficial fungal activity to promote fine grass, thatch reduction and disease management.

- Increases Cation Exchange Capacity (CEC)
- Improves nutrient uptake and stimulates plant growth
- Increases microbial activity to improve soil structure

Available as a liquid or soluble powder.

Humate, humic and fulvic acids are essential food for fungi and a stimulant for plant growth and soil structure. **Symbio Humic Booster** can be applied as a foliar feed or soil drench and mixed with all Symbio products plus liquid fertilisers.

Soluble

Application  
1-5Kg  
per hectare

Dissolve in 400 litres of water.

Liquid

Application  
10-20 litres  
per hectare

Apply in 400 litres of water.

Pack size  
soluble  
10Kg sack

Pack size  
soluble  
25Kg sack

Pack size  
liquid  
20 litres

## SYMBIO SILICON

RAPIDLY AVAILABLE POTASSIUM SILICATE K<sub>2</sub>O  
12% SiO 24%.

### For a faster, stronger sward

- Strengthens cell walls for stronger disease resistant grass.
- Lifts grass blade for a cleaner cut and removal of *Poa annua* seed heads.
- Increases ball roll and green speed.
- Reduces water loss in dry weather
- Foliar potassium promotes photosynthesis

Application  
5 litres  
per hectare

In 300-600 litres of water.  
To increase ball roll or green speed apply 4-7 days before competition.

Pack size  
5 litres



# Oxygen Transfer Technology

## SYMBIO LIQUID AERATION

A REVOLUTIONARY PRODUCT THAT OXYGENATES THE ROOTZONE AND THATCH LAYER ENCOURAGING HEALTHY SOIL MICROBE AND PLANT GROWTH IN COMPACTED, OXYGEN STARVED ROOTZONES

- Eliminates anaerobic black layer
- Combats the effects of squidge, water logging and compaction
- Encourages the breakdown of thatch
- Substitutes physical aeration in wet conditions
- Increases the uptake of applied nutrients for rapid growth
- Encourages healthy microbial activity in the rootzone
- Friable rootzones retain water when dry, and drain faster when wet

### APPLICATION

**Symbio Liquid Aeration** may be mixed with most biostimulants and fertilisers. If the anaerobic layer is deep in the root zone, the best results will be obtained by tining to the anaerobic layer before spraying to allow the liquid to penetrate quickly through the rootzone to the affected layer.

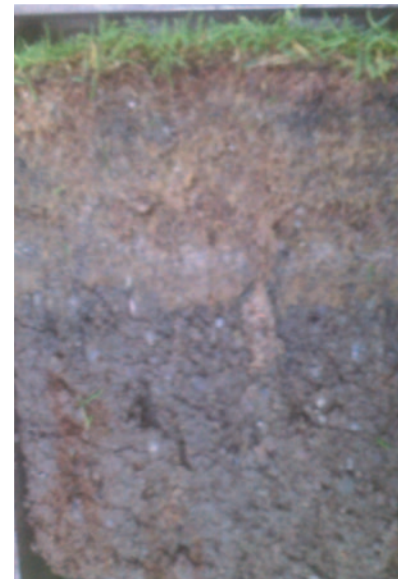
Application  
2.5-5 litres  
per hectare

In 400-600 litres of water.

Pack size  
5 litres

*"Having been introduced to an understanding of the science of soil biology we implemented microbial and organic solutions in the challenging task of fine turf greenkeeping. The regular use of Tea Compost has promoted significant grass root development and a healthy, disease free sward. I would not have thought it possible but the transformation in our bowling green speaks louder than words."*

Ian Lonsdale | Greenkeeper, Rothienorman Bowling Club



Before Liquid Aeration

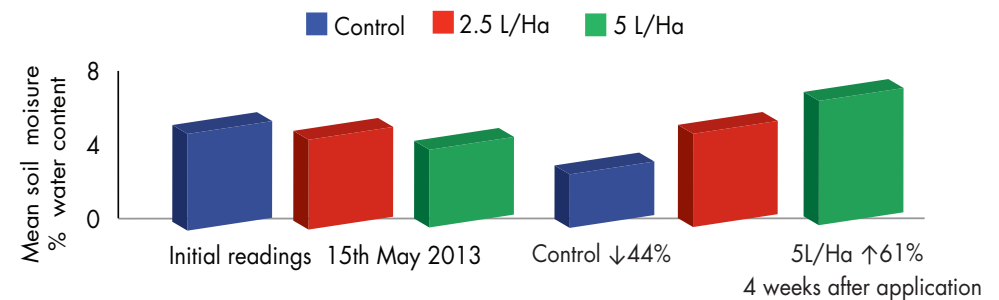


3 weeks later

Thatch reduction and rootzone improvement on a 10 year old USGA specification rootzone before and 3 weeks after application of Symbio Liquid Aeration.

Showing thatch reduction, improved friability and improved drainage.

### Improved rootzone friability and water retention in drought conditions



Trial conducted by G. Giadina. University of Surrey

# Innovations in Dry Patch Management



**Biostimulants – Keeping the Biology Alive**

## SYMBIO INCISION

A polymer wetting agent combining penetrating surfactant technology with the water retaining power of polymers. Even distribution of water throughout the rootzone is essential for the plant and playing surface in times of drought and deluge.

### Incision combines

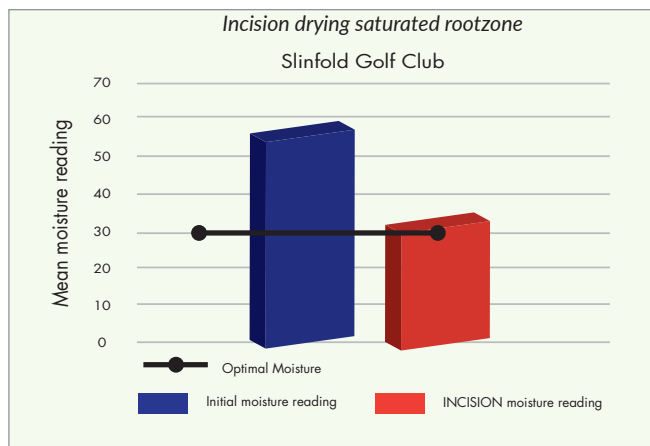
- Penetrant technology to ensure even distribution of water through the rootzone and rapid removal of excess water during times of heavy rainfall
- Water retaining polymers to hold onto water in a thin film around the soil particle to ensure the all-important airspace between soil particles is maintained in times of drought
- Uniform uptake of liquid fertilisers and pesticides is essential for level growth and Incision ensures that nutrients, biostimulants and pesticides are evenly distributed throughout the rootzone

**Symbio Incision** is best applied from spring onwards to prevent dry patch but may be used as a cure for existing dry patch at any time of year, with an initial application of 20 litres per hectare cutting quickly through the profile to the hydrophobic layer.

Application  
**10 litres  
per hectare**

In 800 litres of  
water

Pack size  
**10 litres**



*Symbio Incision Trial at Slinfold Golf Club showing 43% reduction in average water content of waterlogged green from 57% to 32% saturation.*

### SYMBIO TRIALS DATA

#### Incision Wetting Agent STRI Trial



The efficacy of Symbio Incision was compared to two of the industry leading wetting agents; Qualibra and Revolution, during lab based trials conducted by STRI between February and May 2014.

20 cores were collected by STRI from the course at Royal Liverpool Golf Club, from an area known to have problematic hydrophobicity. Leached irrigation water, core weight loss and cumulative soil moisture loss were measured. Qualibra was applied at the equivalent of 20L/Ha; Revolution was applied at 19L/Ha and Symbio Incision was initially applied at 20L/Ha and then subsequent applications were reduced to 10L/Ha. All products and the control used a water rate equivalent of 700L/Ha.

#### Results:

Core weight loss and cumulative soil moisture loss: cores were weighed immediately prior to each wetting agent application and then again afterwards. Between applications of the wetting agents a further three measurements were recorded on a weekly basis. This data was used to produce the core weight loss and cumulative weight loss.

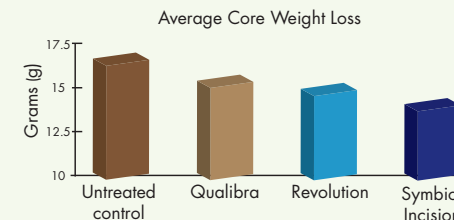


Fig 1. Symbio Incision retained on average more moisture, resulting in a significantly lower core weight loss compared to the untreated control (P < 0.05).

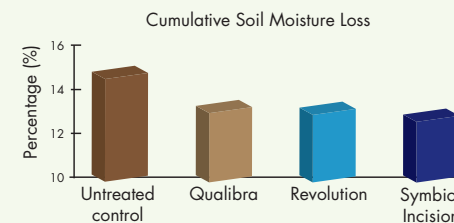


Fig 2. Symbio Incision maintained core moisture, resulting in a significantly lower cumulative soil moisture loss compared to the untreated control (P < 0.05).

#### Conclusion:

Symbio Incision's complex chemistry allows beneficial soil moisture to be retained. Consequently, although grass growth was not maintained on these cores, Symbio believe Incision can enhance plant growth in times of drought whilst reducing the need for excessive irrigation.

# Innovations in Dry Patch Management

## SYMBIO SUPA YUCCA

### COMBINED WETTING AGENT AND BIOSTIMULANT

A super concentrated natural extract derived from *Yucca schidigera* is an ideal alternative to synthetic surfactants, wetting agents and soil penetrants and is completely non-phytotoxic.

**Symbio Supa Yucca** breaks down the waxy coating that prevents water from entering the plant in the same way as conventional wetting agents.

Supa Yucca has a pH of 4.5 so is ideal for buffering alkaline water and may be tank mixed with compost teas to combine a biological and chemical defence against dry patch.

Application  
2 litres  
per hectare

In >600 litres water.

Pack sizes  
1 litre,  
5 litres



Chipstead Golf Club  
rootzone before and after  
two years with Symbio

## SYMBIO HYDROAID PLUS

### BUDGET WETTING AGENT AND PENETRANT FOR SPORTS PITCHES, GREENS, SURROUNDS, TEES, FAIRWAYS AND OUTFIELDS

**Symbio HydroAid Plus** plus is an all purpose wetting agent and penetrant designed to break down the coating, that prevents water ingress into the plant causing hydrophobic conditions. It also acts as a penetrant and encourages water to move through the rootzone in wet conditions.

Use HydroAid Plus in times of heavy rainfall to improve percolation rates.

Application  
10 litres  
per hectare

In 800 litres of water.

Pack sizes  
10 litre,  
200 litres



## SYMBIO AQUACEPT

### A ESTABLISHED BIOLOGICAL SOLUTION TO THE HYDROPHOBIC LAYER CAUSED BY FAIRY RINGS AND FUNGAL DRY PATCH

Many turf managers experience a hydrophobic layer 4-6cm thick just below the thatch layer. It often occurs in conjunction with or near fairy rings. The hydrophobic layer is caused by organic wax and protein based hydrophobins excreted by fungi that coat the soil particles making the soil hydrophobic. The bacteria in **Symbio Aquacept** are chosen for their ability to digest the protein and waxes and out-compete the fungi for nutrient, removing the cause of the problem.

Simply activate the microbes in lukewarm water, tine to the depth of the hydrophobic layer, mix the solution with a wetting agent e.g. **Symbio Supa Yucca** and apply with enough water to get even distribution into the hydrophobic layer.

Application  
5 litres  
per hectare

Pack size  
5Kg

# Problem Solving with Symbio

Disease, Fairy Rings, Root Feeding Nematodes and Dry Patch  
These are all symptoms of microbially deficient soil and weak grass when non beneficial microbes have colonised your sward, thatch layer and rootzone.

## SYMBIO COOL TABS

Symbio Cool Tabs are an easy to use effervescent tablet, that contain enough bacteria spores to naturally treat up to 850m<sup>2</sup>.

- Help prevent fertiliser leaching in heavy rain
- Degrade cellulose to reduce thatch
- Solubilise phosphate to make it available to the plant
- Maintain biological activity in the soil for strong healthy grass
- Assist in repair of disease scars and dry patch

Contains 5 species of Bacillus bacteria found naturally in healthy soils.

### APPLICATION

12 Cool Tabs in 600 -800 litres clean chlorine free water per hectare. Add the Cool Tabs direct to the half filled spray tank, allow 2-3 minutes for the Cool Tabs to dissolve then add any biostimulants or liquid fertilisers and fill up with water. If using mains water, add the water to the spray tank at least 1 hour before use to allow chlorine to dissipate.



Pack size  
12 tabs per  
tube

*"We approached Symbio around 3 years ago to help with a major thatch problem that we had on our greens caused by excess feed and water and lack of aeration. Symbio put together an annual strategy to alleviate this problem which contained a combination of revised nutrition, thatch eater products and additional aeration. We started to see results within 3 months. 3 years later, the greens are now healthier and firmer with improved*

## SYMBIO BIO TABS

EASY, NO MESS, WAY TO PUT ESSENTIAL MICROBES IN YOUR ROOT ZONE

Simply dissolve the effervescent tablet in your spray tank. Each tablet contains enough fungi and bacteria spores to naturally treat up to 1,000m<sup>2</sup>.

- Replaces Beneficial Organisms - killed by chemicals, drought, compaction and frost
- Assists repair of disease scars, fairy rings and dry patch
- Make nutrients more soluble and available to the plant
- Converts thatch to humus improving water and nutrient retention

Contains 4 species of soil fungi and 6 species of soil bacteria.

### APPLICATION

1 BioTab per 1,000m<sup>2</sup> in 60-80 litres clean chlorine free water i.e. 10 BioTabs in 600-800 litres water per hectare.

Apply every 3-4 weeks during the growing season.



Pack size  
20 tabs per  
tube

*root growth and grass species mix. Fungicide use has reduced from applications every 6-8 weeks to less than 1 a year. Members are extremely happy with the continual improvement and we are delighted with the excellent level of knowledge and support that we continue to receive from Symbio."*

Andrew Cook | Partner, Manor Golf Club

## SYMBIO PHYTOGRO 0.0.18

3 IN 1 BIOSTIMULANT, HORMONE STIMULANT AND PENETRANT WITH FOLIAR POTASSIUM.

For the prevention of dry patch and disease scarring.

- Rapidly repairs dry patch and disease scarring especially snow mould and fusarium
- Stimulates hardy spring and autumn growth, increases cell production
- Penetrant reduces dry patch and improves percolation rates in autumn

Symbio PhytoGro 0.0.18 employs a unique combination of: Fatty Acids, Fruit Acids and Vitamins, Penetrants and foliar potassium 0.0.18. The biostimulants increase cell growth and plant hormone production, wetting agents aid water penetration and dispersal and foliar potassium citrate improves photosynthesis, stomatal function and cool season growth.

Apply monthly in spring, late summer and autumn when soil temperature >6°C.

Application  
20 litres  
per hectare

In 400-600  
litres of water.

Pack size  
10 litres

*"After many years of working with Symbio to improve soil health, sustainability and member experience across three different golf clubs, I was delighted to hear the products, service and advice I have utilised will continue to be available under the banner of Origin Amenity Solutions. The increased product range combined with the expert advice we receive from the Symbio team will be of huge benefit to Cawder Golf Club in the years to come."* **Kevin McAleer** | General Manger, Cawder Golf Club

## SYMBIO ROOT REPAIR

FOR RAPID REPAIR OF NEMATODE DAMAGE AND INCREASED FROST TOLERANCE

**A new biostimulant containing complex carbohydrate, chitin and amino nitrogen.**

- Promotes balanced soil biology for rapid recovery from nematode damage
- Improves resistance to frost damage
- Biostimulant for fungi, bacteria and beneficial nematodes

Application  
**10 litres  
per hectare**

For frost tolerance.  
Disease and stress  
resistance monthly usage.

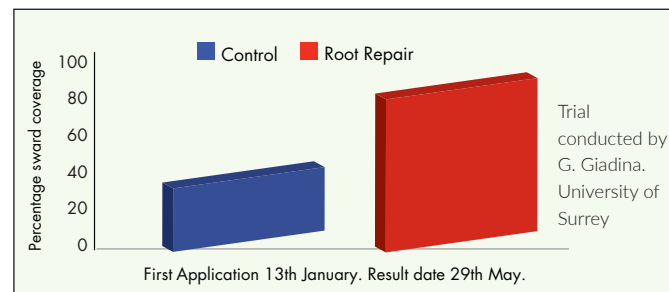
In 400-600 litres  
of water.

Application  
**15 litres  
per hectare**

To repair nematode  
damage use every  
two weeks for 3 or  
4 applications.

Pack size  
**10 litres**

Root repair increase in frost damaged sward coverage.



## SYMBIO DEFENDER

TURF HARDENER AND AUTUMN/WINTER BIOSTIMULANT

- Promotes stress-resistant, healthy plants
- Hardens the grass against wear and enhances disease resistance
- Used in times of stress to re-balance the trace elements within a plant

**Naturally-occurring nutrients include:**

- A concentrated extract of *Ascophyllum nodosum* seaweed harvested from the Atlantic Ocean from renewable resources, with 5% Iron and 0.3% Copper.
- Vitamins A, B1, B2, B3, B5, B12, C, D, E, K, choline and carotene.
- Bioactive amino acids including alanine, valine, glycine, isoleucine, serine, tyrosine and stress protecting amino-betaines.
- Plant hormones: auxins, gibberellins, and cytokinins.
- Essential trace elements including boron, copper, iron, magnesium, manganese, molybdenum and zinc

Application  
**10 litres  
per hectare**

### TIMING

Use as a biostimulant year round and winter turf hardener. Apply monthly or tank mixed with biostimulants or liquid fertilisers as required.

Pack size  
**10 litres**

In 300-600 litres of water.

# Maintenance Essentials

## SYMBIO OIL REMOVER

EVERY TURF MANAGER SHOULD HAVE OIL REMOVER ON STANDBY

Oil spills are a fact of life. **Symbio Oil Remover** makes you prepared for immediate action. Simply mix Oil Remover in a bucket of water, brush or drench the affected area and the enzymatic and surfacant action will break down the oil to water soluble elements and nutrient. For use on grass and hard surfaces 1Kg treats up to 1,000m<sup>2</sup>.

Pack size  
1Kg



## SYMBIO OIL DEGRADER

FOR LARGER SPILLS WHEN THE ROOTZONE IS CONTAMINATED WITH OIL

Powerful oil degrading bacteria convert oil to carbon dioxide and water in weeks.

Simply drench the contaminated rootzone with **Oil Degradator**, repeat weekly until the smell of oil has gone and it is safe to overseed.

Pack size  
1Kg

## SYMBIO RECYCLE

FOR WASH DOWN TREATMENT SYSTEMS

**Symbio Recycle** breaks down grass organic material, hydrocarbons, pesticides and waste found in wash down and waste water treatment systems.

- For the rapid improvement of overloaded or underperforming biological aerobic waste water treatment plants
- Facilitates the aerobic degradation of a range of grass, hydrocarbons, lignin, cellulose and general organic residues
- Improves nitrification

Application  
50g/m<sup>2</sup>  
system  
capacity

Add to the waste water treatment system or as recommended by your technical advisor, every 7 days.

Pack size  
1Kg

## SYMBIO INDICATOR DYE

A NON TOXIC NATURAL VEGETABLE BLUE INDICATOR DYE, COMPATIBLE FOR TANK MIXING WITH OTHER PRODUCTS

- Highly visible, temporary pattern indicator
- Prevents overlap
- Highlights missed areas
- Identifies wind drift
- Visual guide to the efficiency of spray heads
- Compatible with fertilisers, pesticides, herbicides and fungicides
- Application rate from 25ml per 100L of mixed spray chemicals / products

Application  
25mls

Symbio Indicator Dye per 100 litres of spray.

Pack size  
1 litre

# Tree and Plant Management

Symbio MycoForce provides all the biological support systems the plant needs to survive in its new environment and grow from day one in its new environment.

Plants grown in a nursery in sterile growing media with managed water, fertiliser and fungicide inputs often remain dormant for a year or two or even die when transplanted to the natural environment.

## SYMBIO MYCORRHIZAL TRANSPLANTER

FOR CONTAINERISED AND ROOTBALLED TREES AND SHRUBS

- Improves transplant survival rate
- Accelerates growth rates
- Reduces need for fertiliser and fungicide
- Increases resistance to stress and disease

AN ENDO (VAM) AND ECTO MYCORRHIZAL INOCULANT CONTAINS

Endo Mycorrhizal species – *Glomus clarum*, *G. intraradices*, *G. mosseae*, *G. deserticola*, *G. monosporum*, *G. aggregatum*, *G. etunicatum*, *Gigaspora margarita*, *Paraglomus brassillianum*.  
Ecto Mycorrhizal species – *Pisolithus tinctorius*, *Rhizopogon sp.* Plus beneficial soil bacteria and fungi.

Application  
3g per  
2-3 litre  
rootball

Add 1g for every 1 litre of rootball size. The object is to get an even coating of mycorrhizal spores over the young feeder root system on the outside of the rootball.



Cornus Midwinter on left treated with Symbio Mycorrhizal Transplanter

Pack sizes  
300g,  
1Kg

Pack sizes  
5Kg,  
10Kg

## SYMBIO MYCORRHIZAL WHIPDIP

FOR BARE ROOT AND FEATHERED TREES AND SHRUBS

- Improves transplant survival rates
- Accelerates growth rates
- Reduces need for fertiliser and fungicide
- Increases resistance to stress and disease

An endo (vam) and ecto mycorrhizal inoculant for almost all\* whips, bareroot trees, shrubs, seedlings, cuttings and small containerised plants. Easy to apply as a root dip just before planting.

CONTAINS

*Glomus clarum*, *G. intraradices*, *G. mosseae*, *G. deserticola*, *G. monosporum*, *G. aggregatum*, *G. etunicatum*, *Gigaspora margarita*, *Paraglomus brassillianum*. Ecto Mycorrhizal species – *Pisolithus tinctorius*, *Rhizopogon sp.* Plus beneficial soil bacteria and fungi. Additional sachet of swell gels. WhipDip is made into a paste with the water retaining polymers supplied.

The object is to get an even coating of mycorrhizal spores over the root system. Add polymers, mix and leave for a few minutes until the mixture has the consistency of wall paper paste then dunk bare roots until coated in gel. 300g will be enough for approx 660 bare root trees or 2000 - 3000 seedlings depending on size of root. (Use less water for seedlings).

Application  
300g  
sachet

6-10 litres of  
water

\* Endo and ecto mycorrhizal inoculants benefit most plants except ericaceous species, brassicas, orchids and some annual plants.

Pack sizes  
300g,  
1Kg

Pack sizes  
5Kg,  
10Kg

# Water Management

Symbio's biotechnology restores and manages healthy aquatic ecosystems at a fraction of the cost of chemical treatments and dredging.

Good water quality is essential for irrigation and the pleasant appearance of water features and lakes.

## SYMBIO BLUEWATER

### TREATMENT FOR PROBLEM LAKES, PONDS AND WATER FEATURES

- Prevents the growth of blanket weed and unicellular algae
- Helps to prevent green and cloudy water
- Reduces organic silt build-up
- Eliminates odour problems
- Non-chemical, safe for fish

### ACTION

**Symbio BlueWater** is a natural formulation of bacteria, enzymes and buffers contained in a water soluble sachet. The bacteria in BlueWater use the nitrates and phosphates that feed algal growth as their own food source, starving the algae and reducing algal growth. Other bacteria break down and mineralise the organic solids from fish and waterfowl excreta and decaying plant material that results in cloudy water, sludge build-up and foul odours.

### APPLICATION

**Symbio BlueWater** is supplied in 250g water soluble sachets for use in lakes and ponds with a volume larger than 800m<sup>3</sup>. Just throw the required number of sachets evenly around the lake.

### DOSAGE

Apply 1 x 250g BlueWater sachet per 800m<sup>3</sup> – 1,000m<sup>3</sup> (use higher dosage for shallow water under 1m deep) every 1-2 weeks through the algae growing season when the water temperature is above 8°C.

### For smaller water features and fishponds:

Apply 1 x 20g scoop of Symbio BlueWater Junior per 25m<sup>3</sup>. (5,500 gallons) once every 2-3 weeks.

### ECOLOGY

BlueWater is harmless to aquatic life and to rooted plants. BlueWater creates a less stressful environment for fish and amphibians.



Before



After

Before and after applying Symbio BlueWater

Pack size 8, 25, 50 sachet tubs



*“Using Blue Water over the last five years has enabled me to provide a much better service for my customers by keeping their ponds and lakes algae free all year. I wouldn’t hesitate to recommend Blue Water to anyone.”*

Tim Soane | Managing Director, Clearwater plm

## SYMBIO AQUABLUE

### COLOURANT FOR PONDS AND LAKES

- Reduces algal growth
- Reduces the growth of submerged aquatic plants
- Complements the effects of BlueWater sachets

### ACTION

**Symbio AquaBlue** is a highly concentrated blue vegetable dye which filters out the wave lengths of light that promote photosynthesis, this reduces algal growth whilst creating a more aesthetically pleasing water feature.

### APPLICATION

AquaBlue should be added to ponds and lakes at several different locations to ensure even distribution. For smaller water features, it is advisable to pre-dilute a small volume of AquaBlue in separate container to avoid accidental overdosing. If you are unsure of water volumes or desired colour intensity, add a small volume of AquaBlue; allow to disperse and re-apply until the desired colour intensity is achieved.

### DOSAGE

AquaBlue is typically applied at a rate of 1 litre per 5000m<sup>3</sup> – 7500m<sup>3</sup> of water (1.1 million – 1.7 million gallons). The colouration will remain for several weeks and can be topped-up as required.

Notes: AquaBlue will not stain birds or fish when used at the recommended rates although it is advisable to avoid dosing the product close to swimming waterfowl. AquaBlue will not disrupt fishing, swimming or irrigation once the product has dispersed throughout the entire water body. **AquaBlue should only be used in closed water systems.**

Pack size  
1 litre

## SYMBIO LAKE SHADOW

A special blended lake colourant which creates an artificial shadow within the water to halt light from reaching the bottom, which in turn will inhibit or halt any growth of the dreaded algae.

- Works in all large ponds, lakes and fisheries
- Very economical to use
- Blocks light, denying algae's food source
- Lasts up to three months
- Free of pesticides and herbicides
- All year round use

Just 1Kg will treat 4 million litres.

### APPLICATION and DOSAGE

**Symbio Lake Shadow** is supplied in 1Kg boxes containing 5 x 200g water soluble sachets.

Pack size  
5x 200g  
sachets

*“Using Symbio Blue Water is the most effective and economic way we have found of keeping our angling lake free of blanket weed having tried all other available methods.”*

Tony Little | Area Parks Officer, Southend Borough Council

Remove problem blanket weed and green algae.

