SYMBIO TRIALS DATA

Symbio Incision
A new water retention and penetrating agent

Maintaining
The Air and Water Balance
in Sports Turf Root Zones

STRI
and
Field Trials Data

14th January 2015

Symbio, Unit 8, Coopers Place, Combe Lane, Wormley Surrey, GU8 5SZ
Tel: 44 (0) 01428 685762 Fax: 44 (0) 1428 685702 www.symbio.co.uk fineturf@symbio.co.uk

Incision Wetting Agent STRI Trial

Symbio & STRI

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.

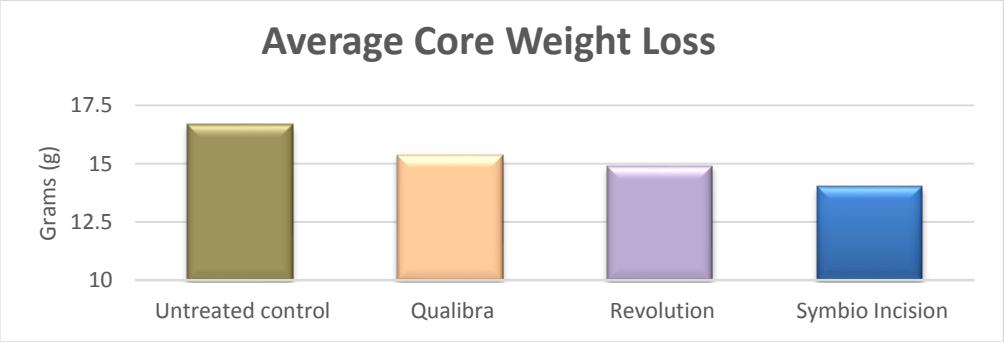


Fig 1. Symbio Incision retained on average more moisture, resulting in a significantly lower core weight loss compared to the untreated control ($P < 0.05$).

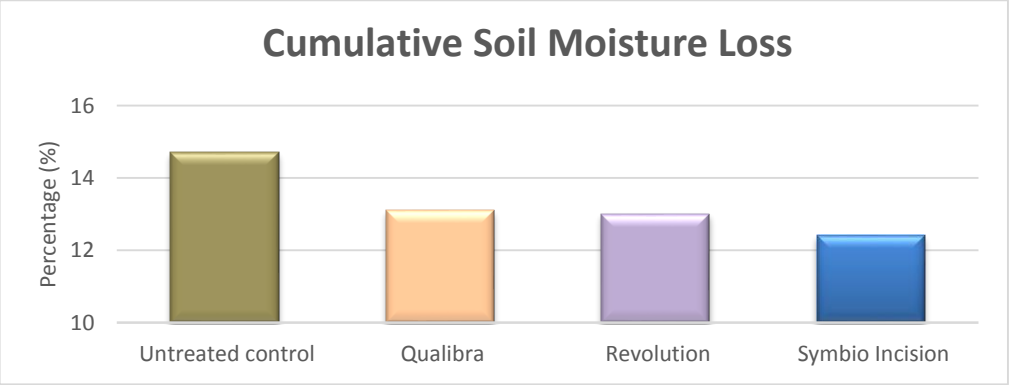


Fig 2. Symbio Incision maintained core moisture, resulting in a significantly lower cumulative soil moisture loss compared to the untreated control ($P < 0.05$).

Conclusion:

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

Symbio, Unit 8, Coopers Place, Combe Lane, Wormley Surrey, GU8 5SZ
Tel: 44 (0) 01428 685762 Fax: 44 (0) 1428 685702 www.symbio.co.uk fineturf@symbio.co.uk

Field Trials

The efficacy of Symbio Incision was trialled at Hurtmore Golf Club, Bramley Golf Club, Cranleigh Golf Club and Slinfold Golf Club. The trial lasted 4 months from June until the end of September 2014. The trial period was exceptionally warm and dry with day time temperatures often exceeding 24°C.

The Symbio Incision was initially applied at a rate of 20L/Ha and then subsequent applications were at the rate of 10L/Ha, in between 600 – 800 L of water. Three applications of Symbio Incision and the 'Alternative' wetting agent were made at each trial site on a monthly basis. All other management techniques and nutritional requirements were standardised, as per each clubs individual guidelines.

Hurtmore is a predominantly chemically managed course, with a sward consisting of *Poa* / bent mix. Cranleigh, Slinfold and Bramley are biologically managed courses again with swards comprised of a *Poa* / bent mix. Cranleigh and Bramley have fully functioning irrigation systems. None of the clubs have serious thatch problems, disease occurs but incidences remain low and the soil profiles of all are good. Bramley have Push-up greens, Slinfold have sand based – like USGA, Cranleigh has 5 sand based greens and the rest are Push-up's. Hurtmore has USGA specification greens.

Trials conducted by Dr Su Hodgson

Symbio, Unit 8, Coopers Place, Combe Lane, Wormley Surrey, GU8 5SZ
Tel: 44 (0) 01428 685762 Fax: 44 (0) 1428 685702 www.symbio.co.uk fineturf@symbio.co.uk

SYMBIO TRIALS DATA

Hurtmore Golf Club.

Improving water retention

Irrigation at Hurtmore is by hand.

After wetting agent applications it was recorded that Incision raised the moisture levels to a figure which was beneficial for plant growth, while Aqua45 made moisture start bordering on excessive for finer grasses.

Fig 1. Both Symbio Incision and Aqua45 increased the mean amount of beneficial soil moisture in the profile during the period of the trial. Sward health, colour and soil profile remained consistently good throughout the trial period.

Symbio Incision a mean value for soil moisture of 25.75%, which was an increase of 73.5% compared to an increase of 52% achieved by the Aqua45 (Fig 2.). Symbio Incision kept the profile moisture within optimal range for the sward composition present. Aqua45 increased moisture retention to levels which started to become excessive.

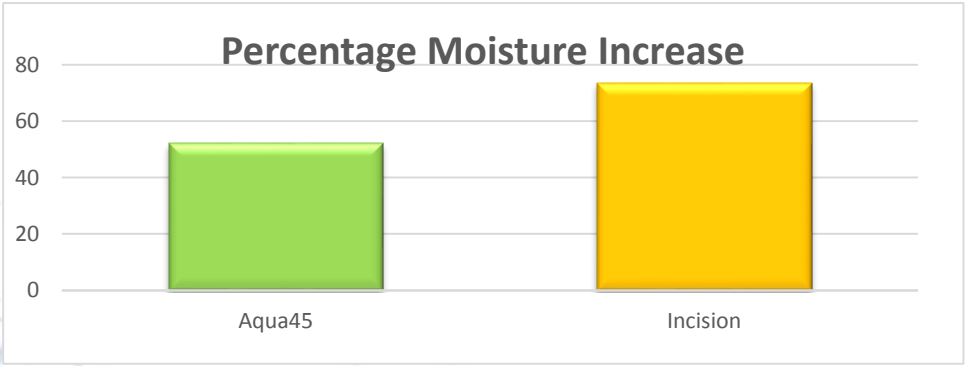


Fig 2. Mean Moisture Percentage increase at Hurtmore

Symbio Incision retained beneficial moisture levels in the greens throughout 2014, reducing irrigation water required. Sward health, colour and the soil profile also remained consistently good. The greens dried out badly due to an irrigation failure but after the application of Incision they were looking brilliant and the sward recovered within a couple of days'

Louis Ayres Course Manager Hurtmore Golf Club

Trial performed by Dr Su Hodgson

Symbio, Unit 8, Coopers Place, Combe Lane, Wormley Surrey, GU8 5SZ
Tel: 44 (0) 01428 685762 Fax: 44 (0) 1428 685702 www.symbio.co.uk fineturf@symbio.co.uk

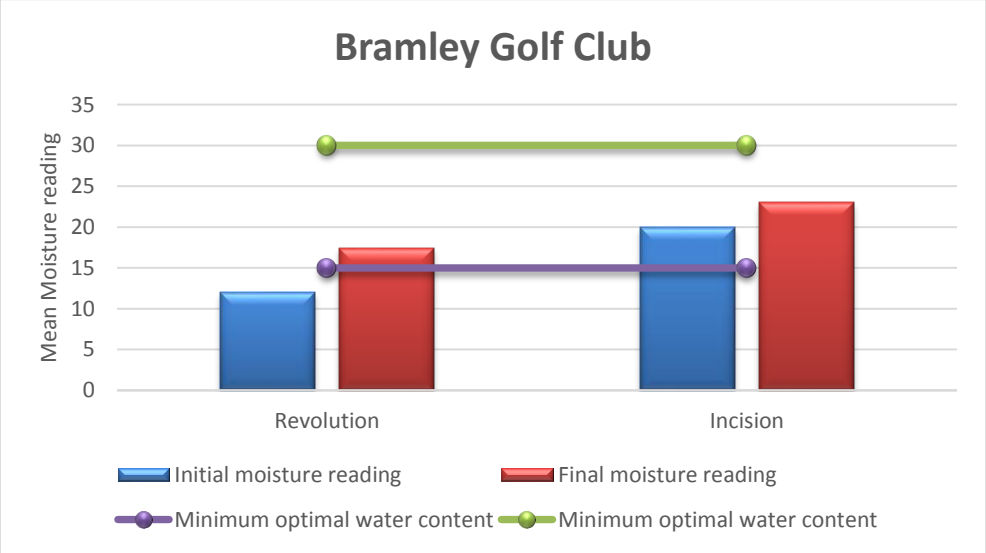
SYMBIO TRIALS DATA

Bramley Golf Club.

Improving water retention

Bramley has a fully functioning irrigation system but the trial greens combine areas of high saturation and severe dry patch.

Some areas of this green were prone to holding too much water whereas one area, normally struggled with to produce sward coverage in the summer months. .



Symbio Incision worked exceptionally well at Bramley Golf Club. One green to which it was applied had an area which suffered severely from hydrophobicity which normally resulted in non existent sward coverage in this region during the summer months. After the first application of Incision the visible health and colour of the sward was enhanced and by the end of the trial the grass in this region was positively thriving.

Moreover, even though Symbio Incision increased beneficial profile moisture in the very dry areas it balanced and reduced the moisture to an acceptable level in those areas prone holding moisture.

Interestingly, Bramley Golf Club found that dew suppression was enhanced after applications of Incision; lasting several days.

"Symbio Incision retained beneficial soil moisture between May and October 2014, a very hot dry summer period. This resulted in grass coverage on an area which historically was too dry to support grasses, even if other wetting agents and intensive irrigation was applied. Symbio Incision also maintained good sward health and colour." Martyn Gray, Deputy Head Keeper, Bramley Golf Club

Symbio, Unit 8, Coopers Place, Combe Lane, Wormley Surrey, GU8 5SZ
Tel: 44 (0) 01428 685762 Fax: 44 (0) 1428 685702 www.symbio.co.uk fineturf@symbio.co.uk

Slinfold Golf Club.

Improving percolation rates

Slinfold does not have an irrigation system; only watering when required with drenches.

The trial green was prone to holding excessive amounts of water in the profile. This was due to location and vicinity, surrounded by trees and being shaded. Silver thread moss which was extremely prevalent on many of the greens at Slinfold, blackened and died off after applications of Incision. This allowed the ingress of grasses to these areas for the duration of the trial. Other greens which were treated with HydroTain seemed to struggle with drought stress and remained for the summer season visibly weaker in colour and health.

Incision decreased water content by 44% Due to the water inputs and shaded conditions some areas of the green remained very wet during the trial period

Symbio, Unit 8, Coopers Place, Combe Lane, Wormley Surrey, GU8 5SZ
Tel: 44 (0) 01428 685762 Fax: 44 (0) 1428 685702 www.symbio.co.uk fineturf@symbio.co.uk

Cranleigh Golf Club.

Improving Percolation rates

Cranleigh Golf Club did have a functioning irrigation system which was prone to leaks and problematic. The greens tested were both in areas were surrounded by trees, shaded and were prone to holding excessive levels of water in places, especially the green where Symbio Incision was applied.

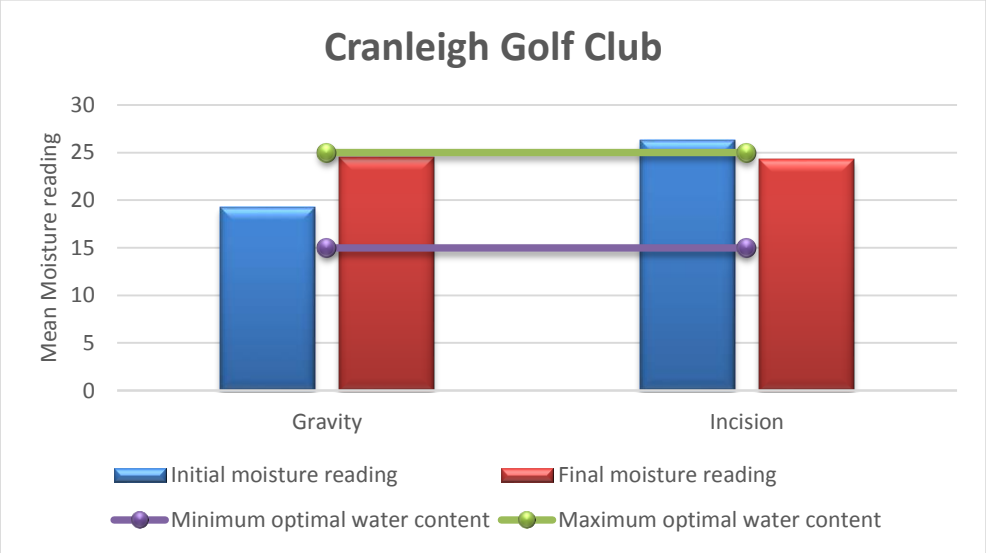


Fig 6. At Cranleigh applications of the Gravity increased the soil moisture content to more conducive levels. Yet, the Symbio Incision enhanced percolation and reduced the moisture to a level beneficial for the sward composition.

The applications of Symbio Incision and the Gravity at Cranleigh showed differing results (Fig 7.). The Gravity increased the moisture content of the greens, but this did seem to promote a vast amount of moss accumulation. Moreover, applications of Incision slightly reduced the moisture content of the substrate, creating plant beneficial levels.

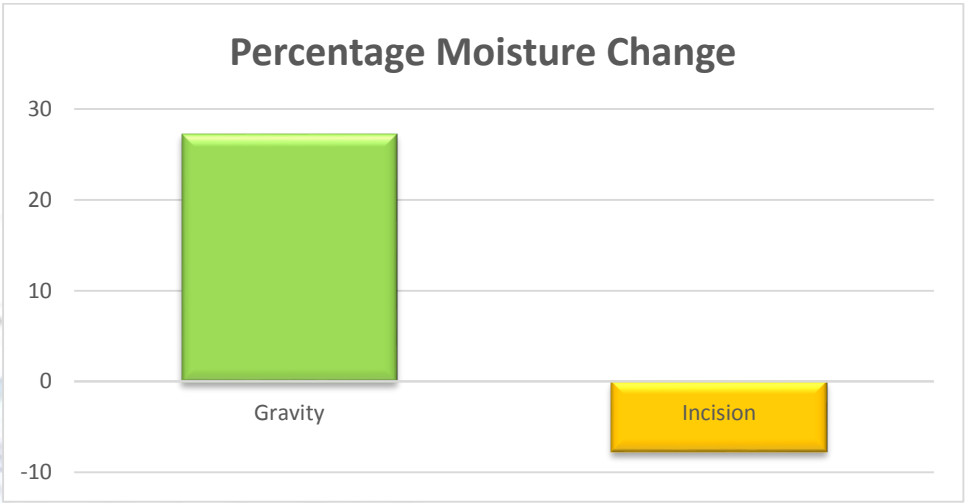


Fig 7. Mean Moisture Percentage increased when using the Gravity and decreased whilst using Symbio Incision at Cranleigh

Incision Wetting Agent Trials
Summary of field trials

BA Clubs Football Pitch Trials

A single application at 20L /hectare was made to a football pitch on 13th August 2013 in dry condition Irrigation was not always possible when required. Prior to the single application the area was scarified using a tractor mounted Rytec fitted with the scarifying tines set shallow to verticut. The area was also spiked prior to the application.

The application of Symbio Incision was completed at a rate of 20 litres per hectare in 600 litres of water on an area of 7500 sq.m. applied in 2 passes. And watered in with 30m3 water

Malcolm Gardner Head Groundsman at BA Clubs comments
"On subsequent visits it was noted that the evenness of moisture in the soil profile was very good and the areas of dry patch were very much reduced compared to other areas close by; leading us to conclude that the Symbio Incision was allowing for the better management of our water resources."

Metropolitan Police - The Warren, Bowling Green.

The bowling green suffered severe dry patch in July and August 2013. The worst dry patch was on areas heavily treated with ferrous sulphate the previous winter to remove moss. One application of Symbio Incision was applied at a rate of 20L/Ha in early August 2013. It had eliminated the dry patch on the green when checked on 17.9.2013

The Royal County Berkshire Polo Club

Conducted a trial on Pitch 4 a soil rootzone top dressed with 75 tonnes sand/hectare p.a. 10L/Ha Symbio Incision was applied monthly from July until November 2013. The Incision was shown to physically penetrate deep into the substrate enhancing grass growth and colouration, with additional beneficial soil moisture. Importantly irrigation inputs were reduced from 10ml to 5ml per application. Liquid Aeration was trialled on a separate area as a comparison, the grass remained healthy but Incision provided the best results.

Strawberry Hill Golf Club

Symbio Incision was applied monthly from May to September in conjunction with a compost tea programme. Excellent moisture retention in the soil profile and four days dew control was achieved at 10L/Ha of Symbio Incision particularly on the front of greens 5 and 9 which suffer from very heavy wear.

Temple Golf Club

Temple Golf Club used Symbio Incision during both 2013 and 2014, applied at a rate of 10L/Ha for the entire season. Temple has a 70/30 root zone and dresses with pure sand. Symbio Incision produced more consistent and even soil moisture in the soil profile during 2013 and 2014 than wetting agents used previously. The sward health, colour and soil profile were all enhanced by the addition of Incision.

Temple Golf Club August 2013.

Temple Golf Club August 2013.

Pinner Hill Golf Club

After an initial application of 20L/Ha, followed by subsequent monthly applications of 10L/Ha, all fungal dry patch was alleviated at Pinner Hill Golf Club in 2013. During 2014 application of Symbio Incision at 10L/Ha were shown to promote sward health and beneficial soil moisture in the profile.

"*Symbio Incision wetting agent proved to be a big success for us last year and again this year. There has been a reduction in irrigation usage and requirements. We have seen an improvement in general greens health conditions and increased longevity of fertilisers. Playability is improved by retaining moisture in the drier conditions, keeping a give in the surface, opposed to other years when the clay base surfaces went very hard. Jeff Foulger, Course Manager, Pinner Hill Golf Club*"

Pinner Hill Golf Club August 2013.

Symbio, Unit 8, Coopers Place, Combe Lane, Wormley Surrey, GU8 5SZ
Tel: 44 (0) 01428 685762 Fax: 44 (0) 1428 685702 www.symbio.co.uk fineturf@symbio.co.uk