Product Catalogue 2019

Grass Agronomics

NUTRITION | HEALTH | MANAGEMENT

Headland Amenity - 2019

INTRODUCTION

Welcome to 'The Headland approach'

For over 20 years, Headland Amenity has been a leading innovator in the field of speciality fertilisers and chemicals serving the golf and sportsturf markets as well as lawn care and vegetation management professionals.

Many of the country's leading sporting venues appreciate not only our quality product range but our expert agronomic advice. In addition to sports surfaces, Headland products are widely used in the essential maintenance of the UK road network, in local authorities and contribute to healthy, green lawns that the UK is famous for.

Strong relationships with global suppliers mean we can utilise the most up to date technology, helping to produce unique, high quality products designed to provide positive benefits for the wide range of markets we service.

As a result of the success in our home markets, Headland Amenity has a flourishing export business providing the same high quality results throughout Europe and beyond.

Our simple philosophy is based on understanding our customer's issues, needs and requirements – building a structured plan of action to help improve turf quality and our environment. Whether it is a weed control or growth regulator programme or the need for a precise and detailed nutrient strategy, Headland will take the time to find the right solution. If you would like to discuss our products in more detail, please feel free to contact us directly - see the back of the catalogue for your local contact or call our Head Office in Caldecote on 01223 491090.

Headland Technical Support

- Soil nutrient analysis
- Leaf tissue analysis
- Water analysis
- Soil and water salinity testing
- Disease and nematode identification

Nutrient and water analysis

To get a complete picture of the health of your turf, Headland offers a total amenity turf analysis service to its customers – taking soil, turf leaf and irrigation water samples for nutrient, organic matter and particle size analysis. The samples are sent to Lancrop /Yara Analytical Services, a specialist, independent laboratory and the results provided in a clear and concise report.

Using an auger, soil samples are usually taken in an "M" pattern across the area to a depth of 6" and pooled together for each area sampled.

When soil samples are received at the laboratory, they are dried, finely ground and the nutrients extracted for testing using state-of-the-art instrumentation alongside known quality control reference material.

Tissue samples are collected from clippings, which are dried, ground, combusted and then the acid-extracted nutrients are analysed at the laboratory.

Water samples are filtered to remove particulates before the nutrients within the water samples are determined.

Turf disease and parasitic nematodes

For many years Headland has been working with turf managers to minimise the negative effects of plant parasitic nematodes. This experience has resulted in a structured approach to plant health, using our unique plant protectant and plant elicitor products to maintain turf quality during high stress periods (see page 19).

Correct identification of the issue and type of disease or nematode species involved, is the first essential step to ensure a successful outcome. Headland's trained staff can evaluate problem areas and identify damaging organisms, allowing an informed approach to the maintenance of plant health and vigour.

Amenity Forum

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IOG Corporate Plus

...the missing piece that makes all the difference®

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Introduction to the Headland Weathercheck concept and how to sign up for it.

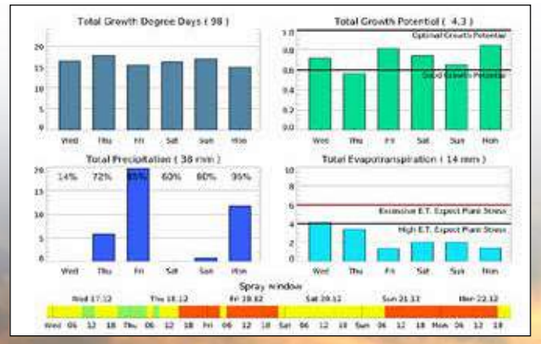
Headland Weathercheck

HEADLAND WEATHERCHECK USES THE LATEST FORECASTING TECHNOLOGY TAILORED SPECIFICALLY FOR THE TURF AND AMENITY INDUSTRY

Headland Weathercheck

As part of its customer support package, Headland Amenity, working closely with Meteoblue in Switzerland, provide a location specific weather forecasting service for golf clubs, sports grounds and other customers throughout the UK and Ireland. This service is called Headland Weathercheck.

Weathercheck features a general 7-day forecast and also provides detailed, 3-hourly, daily weather forecasts, showing predicted rainfall, expected wind strength and precipitation probability alongside a 14-day projection.

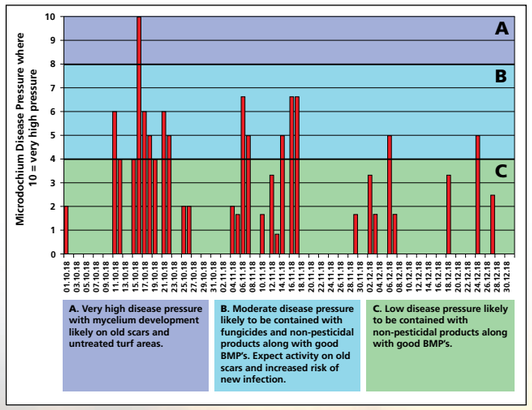


Meteoturf

In 2016 this forecasting service was improved to feature a specific turf-related forecasting module called Meteoturf. This transforms forecasted temperatures into growth prediction models using Growth-Degree-Days and Growth Potential. This enables end-users to see the pattern of predicted growth over the coming week, allowing them to identify uptake windows for fertilisers, growth regulators and pesticides. It also predicts potential growth flushes and periods of plant stress, facilitating a proactive rather than reactive approach to turf management.

During 2019 Headland Weathercheck will undergo a major revamp with a disease pressure predictor model added for *Microdochium nivale*. Looking ahead over the next 7-10 days, the model will assess the potential for disease development specific to the Weathercheck location using hourly forecast data. This will provide advanced warning of disease pressure peaks and enable the end-user to analyse whether they are sufficiently protected or if supplementary applications are required.

A summary schematic of disease pressure from October to December 2018 is shown below;



To subscribe to Weathercheck and/or Mark Hunt's Weatherblog please visit our website at: **www.headlandamenity.com** or email **weather@headlandamenity.com**

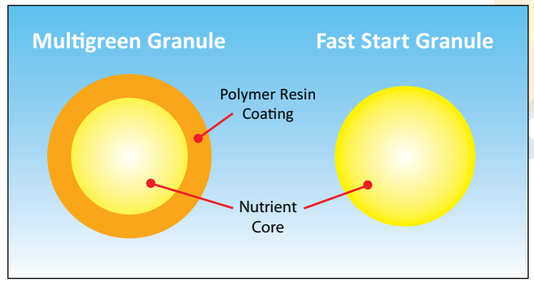
Plant Nutrition

Multigreen® - Temperature controlled release fertiliser

FOR USE ON GOLF COURSES, SPORTS PITCHES, RACECOURSES AND GENERAL AMENITY TURF

How Multigreen® works

Most Multigreen analyses contain an uncoated, 'fast start' portion, blended with a polymer-coated, controlled release prill. Following application, the coated Multigreen prill takes up moisture through pores in the polymer-resin coating.



This 'priming' process takes 7 to 10 days with the initial release period covered by the immediately available, 'fast start' portion of potassium nitrate and / or ammonium sulphate, to provide quick turf response at low soil temperatures.

Once the soil temperature reaches 6°C, release commences from the polymer coated portion of the product in line with grass growth. The longevity of release is determined by the thickness of the polymer resin coat around the prill, the thicker the coating, the longer the product lasts. Multigreen analyses are available in 5 to 6 and 6 to 7 month longevities.

	Multigreen® 627	Multigreen® 526			Multigreen® Fine		Multigreen® Mini	
	Golf tees, approaches, fairways, sports pitches, racecourses and general amenity turf.	Golf tees, approaches, fairways, sports pitches, racecourses and general amenity turf.			Close-mown golf tees, approaches, fairways, sports pitches, racecourses and general amenity turf.		Fine turf including golf and bowling greens.	
Product analysis	20-0-32	28-3-15 +2MgO	28-0-0 +3MgO	15-0-22 +5MgO	25-5-14 +2MgO	19-0-30	24-0-24	12-0-43
Field longevity	6 to 7 months	5 to 6 months			5 to 6 months		5 to 6 months	
Granulation	SGN 280	SGN 280			SGN 125		SGN 125	
Controlled release K	Yes	No			No	Yes	Yes	
Cutting height	>=10mm	>=10mm			>=6mm		Fine Turf	
Application rate	30 to 50g/m²	25 to 35g/m²			25 to 35g/m²		25 to 40g/m²	
Pack size	25kg	25kg			25kg		25kg	
Bag coverage (per hectare)	12 to 20 bags	10 to 14 bags			10 to 14 bags		10 to 16 bags	

Usage Period	J	F	M	A	M	J	J	A	S	O	N	D
Multigreen® 627 20-0-32			●	●	●			●	●	●	●	●
Multigreen® 526 28-3-15			●	●	●	●	●	●	●			
Multigreen® 526 28-0-0			●	●	●	●	●	●	●			
Multigreen® 526 15-0-22			●	●	●	●	●	●	●	●	●	●
Multigreen® Fine 25-5-14			●	●	●	●	●	●				
Multigreen® Fine 19-0-30			●	●	●	●	●	●	●	●	●	●
Multigreen® Mini 24-0-24		●	●	●								
Multigreen® Mini 12-0-43	●	●	●	●					●	●	●	●

Multigreen® - Temperature controlled release fertiliser

FOR USE ON GOLF COURSES, SPORTS PITCHES, RACECOURSES AND GENERAL AMENITY TURF

Plant Nutrition

Multigreen® 526 28-3-15+2MgO and 28-0-0+3MgO Key Points

- Season long fertilisation from one application
- Cool temperature 'fast start' portion for quick response at low temperatures
- Temperature-only release mechanism
- Consistent release pattern means consistent growth with minimal flushes
- Environmentally friendly, leach resistant technology

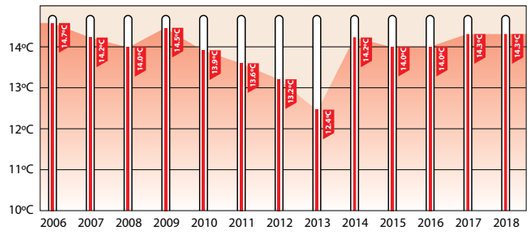
Season-long fertilisation from one application

Fertilising coarse turf can be an expensive operation in terms of both material cost and labour. Multigreen 526 fertilisers provide cost-effective fertilising in a single application, lasting a whole season.

Both Multigreen 28-0-0 and 28-3-15 are formulated to release for 4 months at an average soil temperature of 21°C, but as the table indicates below, the average for March to September is closer to 14°C.

The release of nutrients from Multigreen is solely controlled by soil temperature. The lower the temperature, the longer the release. Taking this temperature data into account, Multigreen 526 products last between 5 to 6 months in the UK and Irish climate, with applications made in April feeding right through until September.

Average annual UK soil temperatures - March to September



Minimal leaching potential of Multigreen proven by Burial Retrieval Trials

Trials conducted over the winter of 2013 / 2014, which turned out to be the mildest and wettest on record indicate that applications of Multigreen Mini 12-0-43 made in October still contained between 50-60% of the applied nutrient the following March. This proves the product not only supplies consistent, leach-resistant nitrogen and potassium through the autumn / winter, but that a significant proportion of this nutrient is available the following spring to promote early season growth and recovery from winter wear.

Renovation - Golf Tees

Once we reach the longer, milder days of March, tees surfaces are well set for renovation in terms of scarification, hollow coring and overseeding. Spring renovation is also a must if a Mosskiller application was made earlier on in the year to remove dead moss plants and open up the sward for new grass plant development. Once renovation has been undertaken, tee surfaces in play are ideal for treatment with a controlled release technology like Multigreen.

Using Controlled Release Fertilisers on Tees

Multigreen controlled release fertiliser only releases its nutrient according to soil temperature and with a working longevity of 5 to 6 months from one application, it means tees can be treated once per growing season with Multigreen.

There are two spring / summer Multigreen analyses suitable for application to tees maintained at 10mm or above - 28-3-15+2MgO and 28-0-0+3MgO. Both have a fast start portion for a quick turf response and are suitable for application to newly-seeded tee surfaces. For closer-mown tees, Multigreen Fine 25-5-14+2MgO is available.

Multigreen® 28-3-15+2MgO or Multigreen® 28-0-0+3MgO

Apply from Mid-March onwards @ 30g/m² on normal rootzone tees. Increase the application rate to 40-50g/m² on new rootzone tees and / or those with a high sand content.

Enhanced presentation especially on shaded tees

Once the tees are growing well in the spring and the overseeded grass plants have established, all that remains is to regulate the growth rate and maintain good presentation. This can be achieved using a plant-growth regulator applied in conjunction with iron every 4-6 weeks throughout the growing season. Trials conducted by Headland Amenity during 2013 showed that when Clipless NT is applied in conjunction with Elevate Fe, the iron effect is extended by the addition of the PGR.

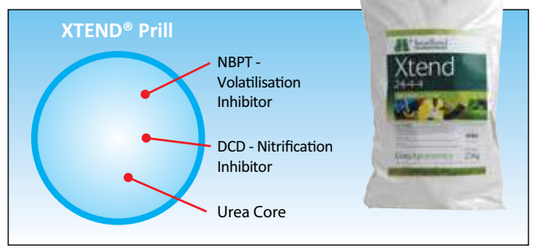
Clipless NT® @ 0.75 - 1.5L/Ha + Elevate Fe® @ 20L/Ha

Every 4 - 6 weeks from the end of April

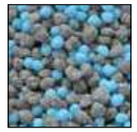
XTEND® - Slow release granular fertiliser

FOR USE ON GOLF TEES, APPROACHES, FAIRWAYS, SPORTS PITCHES, RACECOURSES AND GENERAL AMENITY TURF

How XTEND® works



Each urea prill in XTEND contains two components to enhance the release of the nitrogen;


XTEND 24-4-4 Granular

NBPT - Prevents loss of ammonia nitrogen to the atmosphere by volatilisation, so more nitrogen is available in the soil.

DCD - Slows down the conversion of ammonium to nitrate in the soil, maintaining the nitrogen in ammonium form. Ammonium nitrogen is held more efficiently in the soil because it binds to clay and organic matter.

XTEND® Fine 26-3-3 Key Points

- Fine granule, slow release outfield fertiliser
- Average granule size 1.5mm
- Can be used at low rates on coarse turf and lawns
- 88% stabilised nitrogen provides 2-3 month response
- Excellent turf safety in dry conditions
- Environmentally friendly, leach resistant technology

XTEND Fine 26-3-3 is a fine granule, slow release, outfield fertiliser, formulated to provide extended release by incorporating UFLEXX stabilized nitrogen.

Its fine granulation provides application flexibility where light rates are required. With an SGN of 150 (average granule size = 1.5mm) XTEND Fine 26-3-3 can be applied at rates as low as 15g/m² and still provide good coverage and uniform turf response.

Suitable for close-cut tees, fairways and approaches as well as other coarse turf, XTEND 26-3-3 offers a cost-competitive solution to extended nutrient response. 88% of the nitrogen within XTEND Fine 26-3-3 is stabilised to provide a release longevity of 2-3 months from one application and excellent turf safety during dry conditions.

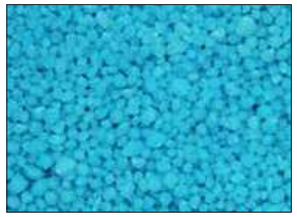
Headland XTEND® Key Points

- Unique slow release nitrogen, feeds for up to 3 mths
- Granular, soluble or liquid formulations
- Suitable for all coarse turf areas
- Efficient use of nitrogen as loss to the atmosphere is limited
- Soluble slow release granules mean no pick-up
- Safer for turf on areas without irrigation
- Liquids are tank-mixable with Cabadex or Quickfire for 'weed and feed' applications

XTEND® 46-0-0 Granular featuring UFLEXX® stabilised nitrogen

XTEND 46-0-0 Granular represents the most cost-effective, slow release granular nitrogen source available.

Featuring 100% of the nitrogen in stabilised form, protected from volatilisation and leaching by NBPT and DCD and providing 2-3 months of consistent nutrient release from one application, with low scorch potential. XTEND 46-0-0 Granular can easily be applied at 15g/m² through a pedestrian spreader using only 7.5 x 20kg bags per application, but providing 69kg of N per hectare over the 2-3 month release period. Solubilising after application in light rainfall or even dew, XTEND 46-0-0 Granular is ideally suited for use on wear areas where a single application is required.


XTEND 46-0-0 Granular

Usage Period	J	F	M	A	M	J	J	A	S	O	N	D
XTEND® 46-0-0		●	●	●	●	●	●	●	●	●	●	
XTEND® 24-4-4			●	●	●	●	●	●	●	●		
XTEND® 15-2-20		●	●	●	●	●	●	●	●	●	●	
XTEND® 10-10-10			●	●	●	●	●	●	●	●	●	
XTEND® 26-3-3			●	●	●	●	●	●	●	●		

	XTEND®				
	46-0-0	24-4-4	15-2-20+MgO	10-10-10+2MgO +Humic Acid	Fine 26-3-3
Field longevity	3 months	2 to 3 months	2 to 3 months	2 to 3 months	2 to 3 months
Granulation	SGN240	SGN240	SGN240	SGN240	SGN150
Cutting height	>=10mm	>=10mm	>=10mm	>=10mm	>=6mm
Application rate	10 to 20g/m²	25 to 35g/m²	25 to 35g/m²	30 to 35g/m²	15 to 25g/m²
Pack size	20kg	25kg	25kg	25kg	25kg
Bag coverage (Per hectare)	5 to 10 bags	10 to 14 bags	10 to 14 bags	12 to 14 bags	6 to 10 bags

XTEND® 10-10-10+2MgO - Pre-seeding fertiliser

SLOW RELEASE FERTILISER

XTEND® 10-10-10+2MgO Key Points

- A slow-release, NPK fertiliser featuring a source of slow release nitrogen, phosphorus and magnesium recovered from UK waste water
- Ideal for pre-seeding or turf establishment
- Long-lasting response from treated nitrogen that works for up to 3 months
- Composted organic base, seaweed meal and humic acid.

Xtend 10-10-10+2MgO is a pre-seed / pre-plant fertiliser that releases its nutrients according to soil temperature and bacterial activity for up to 3 months. All the nutrients within the formulation are available in slow release form thereby extending nutrient over a longer period compared to conventional pre-seed fertilisers. This is especially advantageous on free-draining, high sand content rootzones with low CEC where nutrients are lost rapidly during establishment.

How to use Xtend 10-10-10+2MgO

Xtend 10-10-10+2MgO is suitable for use on golf tees, approaches, surrounds, fairways, cricket pitches, winter season pitches, general amenity turf and in professional lawncare.

Xtend 10-10-10+2MgO can also be used in amenity

plantings and under turf as part of an establishment program. Incorporate the Xtend 10-10-10+2MgO into the rootzone prior to seeding, laying turf or planting.

XTEND® 46-0-0

Slow release soluble fertiliser

FOR USE ON GOLF TEES, APPROACHES, FAIRWAYS, SPORTS PITCHES, RACECOURSES AND GENERAL AMENITY TURF

XTEND® 46-0-0 Soluble

- 100% stabilized nitrogen
- Micro-prilled formulation for rapid solubility
- Low application rates from 20kg per hectare
- Cost effective even compared to agricultural fertilisers

100% stabilized nitrogen

XTEND 46-0-0 Soluble features Hydrexx (a water-soluble powder containing NBPT and DCD) in combination with micro-prilled urea to form a stabilized nitrogen, slow release fertiliser for use on golf course tees, approaches, surrounds, fairways and semi-rough. In addition, XTEND Soluble is ideally suited for use on sports pitches, race tracks and polo fields.

Low application rate and safe to apply

XTEND 46-0-0 Soluble is suitable for application from 20kg up to 40kg per hectare and is safe to use at low water volumes even in the height of summer.

Cost-effective fertilisation for outfield turf

XTEND 46-0-0 Soluble is an ideal solution for keeping budgets in check and, typically, applications made at 30kg of product per hectare are a quarter of the cost of using a 9-7-7 granular fertiliser, with more longevity, better turf safety and no fuel and manpower consuming flush of growth.

XTEND® 34-0-0

Slow release liquid fertilisers

XTEND® Liquid High-N 34-0-0

XTEND Liquid High-N 34-0-0 utilises ammonium and nitrate nitrogen in addition to Hydrexx stabilized urea. 50% of the total N applied is cool temperature available, with the remaining 50% present in slow release form. This makes XTEND Liquid High-N ideal for use as a spring starter on outfield areas in combination with Elevate Fe or Soluble Iron.

Tank-mixable

In common with other XTEND liquid and water-soluble formulations, XTEND Liquid High-N is fully tank-mixable with Headland selective herbicides, including Columbus and Cabadex.

High analysis - low application rate

The high specific analysis of XTEND Liquid High-N ensures that low application rates provide a significant nitrogen input. A 200 litre drum treats 10 hectares when applied at the 20 litre / hectare rate.

Tank-mix suggestions for optimum turf quality (For more tank-mix suggestions see page 59).

Contact Headland for other weed and feed recommendations using XTEND Soluble and XTEND Liquids.

Application	XTEND® 46-0-0 Soluble	Tank-mix Partner	Water Volume
Weed and feed. Common broadleaf weeds	30kg/ha	Quickfire @ 5L/ha	300 to 400L/ha
Weed and feed. Slender speedwell / yellow suckling clover	30kg/ha	Cabadex @ 2L/ha	300 to 400L/ha
Pre-tournament fairway spray summer green up	30kg/ha	Headland Soluble Iron @ 8 to 12kg ha or Elevate Fe @ 20L/ha	200 to 400L/ha
Application	**XTEND® High-N 34-0-0**	**Tank-mix Partner**	**Water Volume**
Early and late season green up	40 to 60L/ha	Headland Soluble Iron @ 8 to 12kg/ha or Elevate Fe @ 20L/ha	200 to 400L/ha

H-Cote™ Mini - Minigranular controlled release fertiliser

NEW!

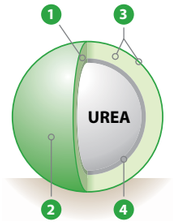
FOR USE ON ALL COARSE AND CLOSE MOWN TURF SITUATIONS INCLUDING TEES, FAIRWAYS, SPORTS PITCHES AND RACECOURSES

H-Cote™ Mini Key Points

- Minigranular controlled release fertiliser
- 3-4 month product release period
- High % of controlled release nitrogen in all formulations
- Minigranular SGN150 formulation (1.5mm) allows low application rates through pedestrian and tractor mounted spreaders down to 15g per m^2
- Complete range for spring, summer and autumn/winter

H-Cote Mini is a new range of minigranular, controlled release fertilisers formulated to release over a 3-4 month period from one application. H-Cote Mini formulations contain a high level of controlled release nitrogen so the release characteristics are gentle and sustained, with minimal risk of flushing or excessive growth.

ADVANCED DUAL-COATING TECHNOLOGY



1. **Less sulphur coating** reduces N lock-off and delivers more N.
2. **Coating integrity** is maintained during transport, blending, bagging and application.
3. **Outer layers** consist of a thin coating of elemental sulphur and polymer wax, which work together to protect the inner polymer coating.
4. **Inner layer** consists of a thin, cross-linked polymer film that encapsulates and protects the urea granule.

How H-Cote™ Mini works

The controlled release fertiliser portion in H-Cote Mini is surrounded by two layers of coating, the first a thin polymer coating that covers the urea prill and the second a mix of sulphur and polymer wax that protects the polymer coating during transport, bagging and application. The combined presence of two thin coatings allows a high specific nitrogen analysis for each prill with less risk of nitrogen lock-off (where an overly thick coating prevents release of the contained nitrogen).

After application, moisture penetrates the twin coatings and dissolves the urea inside which then is released back through the coating according to temperature and moisture. End-user trials in 2018 demonstrated excellent turf safety and sustained, consistent release even during the heat of the summer and with constant irrigation.

	H-Cote™ Mini		
	22-3-8+0.7Fe+0.8MgO	15-5-12+1Fe+1MgO	10-5-14+1.2Fe+1.2MgO
Field longevity	3 to 4 months	3 to 4 months	3 to 4 months
Granulation	150SGN	150SGN	150SGN
Controlled Release N	91%	81%	70%
Cutting height	>=6mm	>=6mm	>=6mm
Application rate	15 to 35g/m^2	15 to 35g/m^2	15 to 35g/m^2
Pack size	25kg	25kg	25kg
Bag coverage (Per hectare)	6 to 14 bags	6 to 14 bags	6 to 14 bags

QuickStart® Maxi Plus & Blaukorn® - Outfield fertilisers

FOR USE ON ALL COARSE TURF AREAS INCLUDING RACECOURSES, SPORTS PITCHES, GOLF COURSE FAIRWAYS AND SEMI-ROUGH

QuickStart® Maxi Plus Key Points

- Homogenous slow release outfield fertiliser
- 2-3 months longevity with good low temperature performance
- Low salt index nitrogen formulation
- Nutrisphere-N - dual action urease and nitrification inhibitor

Quickstart Maxi Plus® 22-5-5 Spring and summer outfield fertiliser

Quickstart Maxi Plus is a regular granule, slow release, outfield fertiliser, formulated to provide good growth at low soil temperatures and extended release due to the combination of ammonium sulphate and urea nitrogen.

Nutrisphere-N® - Nitrification Inhibitor

The nitrogen in Quickstart Maxi Plus is protected by Nutrisphere-N, a new technology nitrification Inhibitor. Nutrisphere-N is a dual action, urease and nitrification inhibitor that is stable in the soil, biodegrades and leaves no residue. Its action is unaffected by pH, temperature and soil moisture and its mode of action does not suppress soil microbial populations. NutriSphere-N keeps more nitrogen available for plant uptake by slowing the conversion of nitrogen into forms that are lost through volatilization and leaching.

Enhanced Safety

With 50% of the nitrogen in Quickstart Maxi Plus in the form of urea, a nitrogen form with a low salt index and all of the nitrogen protected by Nutrisphere-N, Quickstart Maxi Plus provides a safe alternative to quick-release, conventional fertilisers.

Blaukorn® Key Points

- Quick release outfield fertiliser
- Homogeneous fertiliser for even response
- Low rates mean cost-effective application
- Rapidly available nitrogen works at low soil temperatures

Ideal for kick- starting worn areas in the spring

Blaukorn® 15-3-20+2MgO+TE Autumn and winter outfield fertiliser

Blaukorn 15-3-20 is a homogenous granule with no carrier and a highly water-soluble phosphorus content that breaks down rapidly in contact with moisture. Blaukorn 15-3-20 contains ammonium and nitrate, the two most available nitrogen forms for fast response at low soil temperatures. Blaukorn 15-3-20 contains potassium sulphate, which has a much lower salt index and therefore scorch risk, than other forms of potassium, such as potassium chloride.

	Quickstart Maxi Plus® 22-5-5	Blaukorn® 15-3-20+2MgO+TE
Field longevity	2 to 3 months	6 to 8 weeks
Granulation	SGN310	SGN310
Cutting height	>=10mm	>=10mm
Application rate	25 to 35g/m^2	20 to 35g/m^2
Pack size	25kg	25kg
Bar coverage (per hectare)	10 to 14 bags	8 to 14 bags

Usage Period	J	F	M	A	M	J	J	A	S	O	N	D
QuickStart® Maxi Plus		●	●	●	●							
Blaukorn®		●	●	●	●			●	●	●	●	

Easygreen™ Mini - Quick release outfield fertiliser

FOR USE ON ALL COARSE & CLOSE-MOWN AREAS INCLUDING RACECOURSES, SPORTS PITCHES, GOLF COURSE TEES, APPROACHES, FAIRWAYS AND SEMI-ROUGH

Easygreen™ Mini Key Points

- Quick release outfield fertiliser for coarse and close-mown turf
- Homogenous Midi granule for maximum coverage
- Low application rates down to 15g/m^2
- Ammonium and nitrate nitrogen for good low temperature response

Midi Granulation - Optimum coverage at low application rates

Both Easygreen analyses are formulated with an average granule size of 2mm (SGN200) and 90% of the granules are between 1mm to 2.5mm size compared to the more normal 2mm to 4mm granule size of a competitor. This size grading allows Easygreen to be applied right down to 15g/m^2 through either a pedestrian or tractor-mounted spreader, such as a Vicon and still achieve good coverage per m^2. When applied at 15g/m^2, both Easygreen formulations provide 1800 granules per m^2.

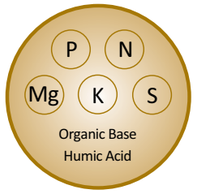
	Easygreen™ Mini	
	21-5-10+3MgO+TE	12-12-17+2MgO+TE
Field longevity	6 to 8 weeks	6 to 8 weeks
Granulation	SGN200	SGN200
Cutting height	>=6mm	>=6mm
Application rate	15 to 25g/m^2	15 to 25g/m^2
Pack size	25kg	25kg
Bag coverage (Per hectare)	6 to 10 bags	6 to 10 bags

Usage Period	J	F	M	A	M	J	J	A	S	O	N	D
Easygreen™ Mini 21-5-10		●	●	●	●	●	●	●				
Easygreen™ Mini 12-12-17		●	●	●	●	●	●	●	●	●		

Greentec® - Fine turf fertilisers

FOR USE IN ALL FINE TURF SITUATIONS INCLUDING GOLF AND BOWLING GREENS

How Greentec® works



Greentec granule

Depending on the product, up to four different forms of nitrogen feature in Greentec fertilisers. This provides optimum response over a wider range of conditions. Each homogeneous Greentec analysis is carefully formulated to provide the nitrogen release curve suitable for its application. For use in cool temperatures, sulphate of ammonia and or potassium nitrate are the chosen nutrient forms. Urea and methylene urea are incorporated in the analyses intended for use in the summer. Most of the Greentec formulations feature a composted organic base designed to stimulate soil microbial activity and add humic acid for enhanced root development and stress suppression. Cold processed seaweed is also utilised. Granulation is optimised for easy application, good coverage and fast breakdown on the turf surface.


Greentec Granules

Rapid breakdown

The granule is formulated to break down quickly after application, on contact with moisture, minimising disruption to play and maintenance practices such as grooming or scarifying.

Where to use Greentec fertilisers

Suitable for use on all fine turf areas including golf and bowling greens and in professional lawncare.

Naturvigor – composted organic base

The incorporation of a composted organic base to two analyses in the Greentec range uses Naturvigor, an aerobically composted cow manure, fortified with humic acid. The addition of this material to each analysis provides an organic nitrogen fraction, stimulates microbial activity and enhances root development.

Slow-release organic potassium

In some products, the potassium source is derived from Kali Vinasse, a potash rich sugar beet pulp. Bound in an organic complex, potassium is released slowly by microbial activity.

Greentec® fertilisers Key Points

- Conventional release, mini granular fertilisers for fine turf
- Features a mix of nitrogen sources to ensure results under a wide range of conditions
- Breaks down quickly to avoid disruption to play
- Uniform granule size for even turf response
- Lower scorch risk than with chloride based formulations
- Suitable for golf and bowling greens

	Greentec®			
	Mosskiller Pro **4-0-4 +9Fe**	**6-5-18 +MgO+4Fe**	**13-3-13 +MgO** (Contains Naturvigor)	**14-2-6 +2MgO+Fe** (Contains Naturvigor)
Field longevity	4 to 6 weeks	4 to 6 weeks	6 to 8 weeks	4 to 6 weeks
Granulation	SGN125	SGN125	SGN125	SGN125
Additional product contents	-	-	2.7% Humic Acid 28.5% Methylene Urea 100% of potassium in organic slow release form	2.7% Humic Acid 100% of potassium in organic slow release form
Application rate	30 to 40g/m²	25 to 35g/m²	20 to 35g/m²	20 to 35g/m²
Pack size	25kg	25kg	25kg	25kg
Bag coverage (Per hectare)	12 to 16 bags	10 to 14 bags	8 to 14 bags	8 to 14 bags

Usage Period	J	F	M	A	M	J	J	A	S	O	N	D
Mosskiller Pro 4-0-4+9Fe	●	●	●	●					●	●	●	●
6-5-18+MgO+4Fe	●	●	●	●	●	●	●	●	●	●	●	●
13-3-13+MgO			●	●	●	●	●	●	●			
14-2-6+2MgO+Fe			●	●	●	●	●	●				

Plant Nutrition

Greentec® - Fine turf fertilisers

FOR USE IN ALL FINE TURF SITUATIONS INCLUDING GOLF AND BOWLING GREENS

Greentec® 6-5-18+MgO+4Fe Key Points

- Ammonium and nitrate nitrogen for rapid response in cool temperatures
- Iron and magnesium for enhanced colour
- Supplies all primary and secondary nutrients – N, P, K, Ca, Mg and S
- Excellent for use as a spring starter

Greentec 6-5-18 provides excellent rapid response, even at low soil temperatures, producing sustained colour without soft, disease prone growth. It achieves this by utilising both ammonium and nitrate nitrogen in its formulation. Both are immediately available to the plant without the need for prior conversion in the soil by bacterial activity. Greentec 6-5-18 is ideal for use in the autumn/winter and also as a spring starter.

Balanced analysis fits leachate research identified requirement

Many turf rootzones feature a high sand content as a result of initial construction or from accumulated top dressing. Leachate trials conducted by Headland Amenity and confirmed by soil analyses, show that after the winter, such root-zones are often low in phosphorus and sulphur. Greentec 6-5-18 supplies all primary and secondary nutrients required to rectify low spring levels of these nutrients in high sand rootzones.

Greentec® Mosskiller Pro 4-0-4+9Fe Key Points

MAPP No. 14625 PCS No. 92418.

- Approved mosskiller for rapid control of moss in turf
- Low nitrogen content for use in cool conditions
- Potassium and iron aid turf hardening and disease resistance
- Fine granule for uniform coverage and consistent response

The 4-0-4+9Fe formulation features a balanced NK analysis and the economy of a lower potassium content than its predecessor. In addition to its mosskilling qualities, it is ideal for use as a spring starter or a low temperature hardener on all areas of amenity turf where prolonged colour, but not growth is required.

Apply after cutting to allow the maximum time to treat the moss before re-cutting. Water-in if applied during dry, hot periods. Avoid applying during rainfall or frost. Remove from hard surfaces immediately to avoid staining.

Use plant protection products safely. Always read the label and product information before use. Please refer to the product label or our website for further technical information.

Greentec® 13-3-13+MgO+2.7% humic acid and methylene urea Key Points

Contains Naturvigor

- Ammonium sulphate fast start for cool temperature performance
- Methylene urea for added longevity
- Ideal for use during high Anthracnose disease pressure periods
- 100% of potassium derived from organic source for extended release

100% of potassium derived from organic source

Greentec 13-3-13+MgO is formulated as a summer granular fertiliser to provide safe and sustained feeding, even during cool, wet periods of weather. The product features four different forms of nitrogen. The first, ammonium sulphate, provides the initial release and low-temperature response. This is enhanced to provide 6 weeks longevity, by three longer term nitrogen forms, urea, methylene urea and organic nitrogen. Granule breakdown is rapid, minimising pick up and like the other Greentec analyses, the fine granulation allows low application rate flexibility, down to 15g/m².

Ideal for application pre-anthracnose disease period

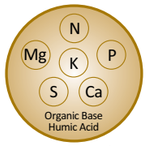
Greentec 13-3-13+MgO is ideally suited to a light rate application in July, just prior to the main anthracnose disease pressure period to enhance growth and provide good levels of plant vigour. Research has shown that one of the most effective ways of preventing Anthracnose is to raise plant nitrogen levels just prior to the main disease period (see page 19).


Anthracnose damage

C-Complex® - Fine turf organic mineral fertilisers

FOR USE ON FINE TURF, GOLF AND BOWLING GREENS, TEES, APPROACHES AND SURROUNDS

How C-Complex® works



C-Complex granule

C-Complex is an organic mineral fertiliser formulated on an aerobically composted, cow manure base enriched with humic acids. This helps to stimulate soil microbial activity whilst enhancing root development and stress suppression.

Granulation is optimised for quick granule breakdown on the turf surface and odour levels are minimal.

C-Complex not only contains humic acid and aerobically composted cow manure, but to provide a complete package, it also contains cold-temperature processed seaweed extract as well as balanced primary, secondary and micronutrients.

Unique granule characteristics – fast breakdown for fast response

For best results, apply C-Complex to a dry leaf

C-Complex utilises 'soft granule' technology which allows faster breakdown when in contact with moisture, without the tacky inter-phase typical of poultry manure based fertilisers. The result is minimal mower pick up and faster plant availability of nutrients, assuring a rapid response.

Contains Naturvigor

Contains Naturvigor

Naturvigor is at the heart of all C-Complex formulations and features a combination of aerobically-composted cow manure fortified with 18.1% humic acid. This provides the ideal organic base to stimulate microbial activity and enhance root development.

Fully composted organic base = no nitrogen drawdown

Non or only partly composted organic fertilisers rely on microbial activity to complete the process, utilising nitrogen from the rootzone to achieve this. In so doing, they deprive the plant of this important nutrient. C-Complex has a fully composted organic base that does not adversely affect nitrogen availability to the plant.

	C-Complex®		
	5-2-10 +2CaO+MgO	7-0-7 +5CaO	4-3-4 +3MgO
Field longevity	4 to 6 weeks	4 to 6 weeks	4 to 6 weeks
Granulation	SGN125	SGN125	SGN125
Additional product contents	7.2% Humic Acid 50% of potassium in organic slow release form	6.7% Humic Acid 100% of potassium in organic slow release form	9.0% Humic Acid 100% of potassium in organic slow release form
Application rate	25 to 40g/m²	25 to 40g/m²	35 to 50g/m²
Pack size	25kg	25kg	25kg
Bag coverage (Per hectare)	10 to 16 bags	10 to 16 bags	14 to 20 bags

Usage Period	J	F	M	A	M	J	J	A	S	O	N	D
C-Complex 5-2-10	●	●	●	●	●	●	●	●	●	●	●	●
C-Complex 7-0-7			●	●	●	●	●	●	●			
C-Complex 4-3-4		●	●	●	●	●	●	●	●	●	●	

C-Complex® 5-2-10+2CaO+MgO Key Points

Contains Naturvigor

- Contains 4 nitrogen sources for improved performance and longevity
- 50% of nitrogen derived from ammonium sulphate and potassium nitrate for good low temperature response
- 50% of potassium derived from organic source for extended release
- 7.2% humic acid and cold-processed seaweed meal

5-2-10+2CaO+MgO is the latest addition to the highly successful C-Complex range of organic mineral fertilisers. Suitable for use as both a spring starter or an autumn/winter fertiliser, its fast granule breakdown and immediately available nitrogen and potassium, provide rapid turf response and extended longevity.

C-Complex 5-2-10+2CaO+MgO offers complete nutrient fertilisation without introducing additional iron that is often found to be in excess.

C-Complex® 7-0-7+5CaO Key Points

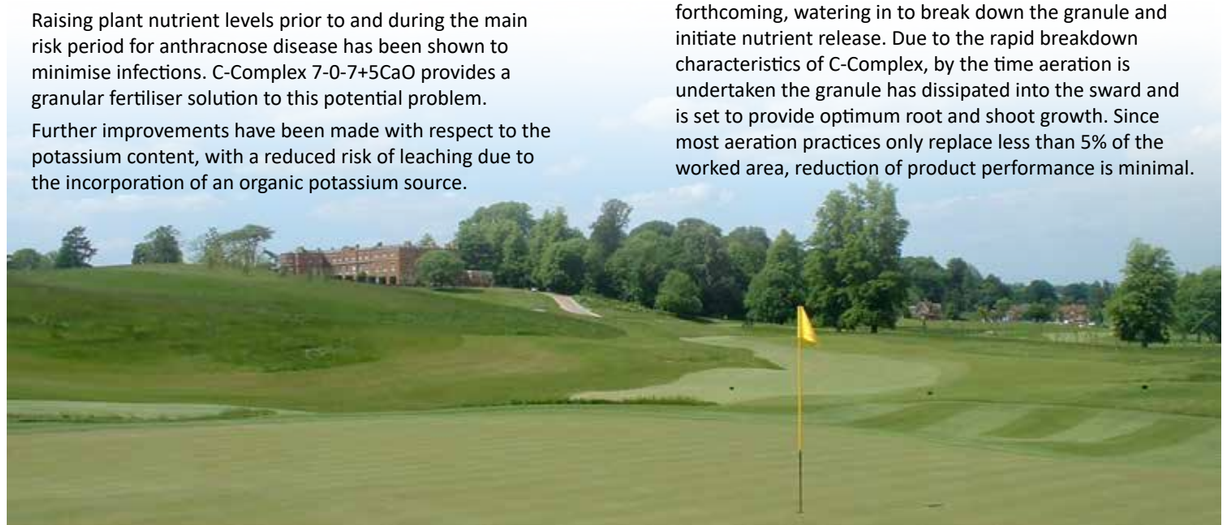
Contains Naturvigor

- Contains 5 nitrogen sources for gentler release in high temperatures
- 34% methylene urea content for extended longevity
- 100% of potassium derived from organic source for extended release
- Suited for use as a summer granular fertiliser
- 7.2% humic acid and cold-processed seaweed meal

C-Complex 7-0-7+5CaO has been improved with the intention of maximising product performance during the summer. The addition of methylene urea adds to nitrogen longevity and results in slower release, making it ideally suited for use as a summer fertiliser.

Raising plant nutrient levels prior to and during the main risk period for anthracnose disease has been shown to minimise infections. C-Complex 7-0-7+5CaO provides a granular fertiliser solution to this potential problem.

Further improvements have been made with respect to the potassium content, with a reduced risk of leaching due to the incorporation of an organic potassium source.



C-Complex® - Formulated for aeration

FOR USE ON FINE TURF, GOLF AND BOWLING GREENS, TEES, APPROACHES AND SURROUNDS

C-Complex 4-3-4+5CaO+3MgO Key Points

Contains Naturvigor

- Contains naturally occuring micronutrients
- Ammonium nitrogen for low temperature release
- 100% of potassium derived from organic source for extended release
- Composted cow manure base
- Cold processed seaweed content
- High Humic Acid content - 9.0%
- Ideally suited for use at aeration

C-Complex® - Specifically formulated for aeration

C-Complex 4-3-4 was developed by Headland Amenity specifically for use at aeration and the formulation contains a number of key benefits to enable rapid recovery;

- 87.5% of the nitrogen is derived from ammonium sulphate for immediate plant availability and rapid recovery
- 50% of the formulation is derived from composted cow manure designed to stimulate microbial populations
- 9.0% humic acid content for enhanced stress suppression and root development
- 'Soft' granule technology ensures fast breakdown and no surface tackiness

The best way to use C-Complex® 4-3-4 for maximum recovery from aeration

With the advent of more powerful topdress incorporation brushes such as the 'Sweep-N-Fill' and the use of lateral aeration techniques such as the Sand-Injection Graden, Headland Amenity carried out trials during 2013 and 2014 to ascertain the best way to use C-Complex 4-3-4 for maximum recovery from aeration. Applying product before, during and after aeration, the results were monitored for consistent growth and speed of recovery. Do not roll the greens following C-Complex application until the granule has dissipated into the grass sward.

The optimum method was to apply C-Complex 4-3-4 to a dry leaf 5 days before aeration and if rainfall was not forthcoming, watering in to break down the granule and initiate nutrient release. Due to the rapid breakdown characteristics of C-Complex, by the time aeration is undertaken the granule has dissipated into the sward and is set to provide optimum root and shoot growth. Since most aeration practices only replace less than 5% of the worked area, reduction of product performance is minimal.

Case study - Summer aeration using C-Complex 4-3-4

Image 1 - The photograph above shows verticut green cored with 13mm tine at 2 inches depth and topdressed with 7mt of sand. C-Complex 4-3-4 applied at 40g/m².

Image 2 - Same green with 80% recovery 10 days after aeration, cutting height returned to summer height of cut - 3mm.

Image 3 - Same green with 95% recovery 14 days after aeration. Note - aeration carried out in mid-August to demonstrate efficacy of early autumn vs. late autumn aeration.

Scan this QR code or visit http://tinyurl.com/displacechart to download the ISTRC Displacement Chart showing % of worked area affected by different tine diameter and spacings.

CalciComplex® - Organic fertiliser

MINI-GRANULAR ORGANIC-BASED CALCIUM PRODUCT FOR PH MANAGEMENT ON GREENS, TEES, FAIRWAYS AND WINTER SEASON PITCHES

CalciComplex® Key Points

Contains Naturvigor

- Designed to gently increase rootzone pH in low buffered acidic soils
- Organic base to stimulate natural soil microflora
- Contains dolomitic limestone for increased pH and Mg input
- Contains Gypsum for added calcium and soil de-flocculation
- High humic acid content to aid root development

CalciComplex is an organic-mineral fertiliser formulated for use in low pH soil situations and is designed to gently raise soil pH over repeated applications as well as stimulate microbial activity, due to its organic component. CalciComplex can be utilised in low calcium soil situations or when extra calcium is required - for example, in high salt environments, to de-flocculate the soil.

In acidic soil scenarios, the activity of microbes, like actinomycetes, responsible for the breakdown and recycling of organic matter, is restricted and therefore accumulation as thatch can occur. This in turn leads to issues related to shallow rooting, increased disease susceptibility due to retained moisture and increased stress susceptibility due to hydrophobicity. The key is to input oxygen and remove organic matter by cultural means – hollow coring, scarification, etc. However, the issue of low soil pH must also be tackled.

By utilising dolomitic limestone, CalciComplex will gently raise soil pH and provide additional calcium in acid soils, as this secondary nutrient is often in short supply.

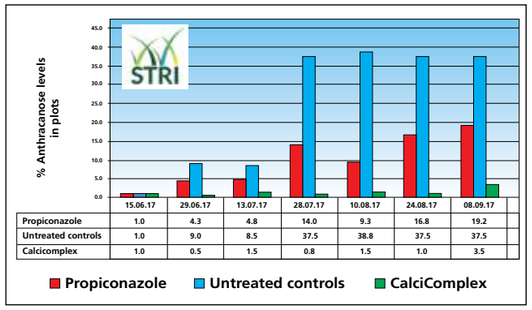
To help stimulate microbial activity, CalciComplex contains the same organic base as utilised in C-Complex, namely aerobically-composted cow manure and cold processed seaweed meal. Granulation is optimised for quick granule breakdown on the turf surface, without the normal tackiness associated with poultry manure-based organic fertilisers and odour levels are minimal.

CalciComplex® aids recovery from aeration and minimises Anthracnose

In the 3 years since CalciComplex was first launched it has become evident that the product stimulates a good level of natural growth simply from the dynamics of the formulation, bearing in mind that no supplementary nitrogen is added to the product during manufacture. For this reason, CalciComplex has become popular where growth and increased plant health is required without the need to add nitrogen.

During 2017, Headland Amenity conducted a trial at the S.T.R.I. to investigate the suppression of *Colletotrichum cereale* (Anthracnose) comparing the efficacy of pesticidal and non-pesticidal treatments. Research in the U.S conducted at Rutgers University has already highlighted that a combination of optimised plant health and balanced nutrition through the main disease period go a long way to suppress the activity of this disease and can dramatically reduce the requirement for fungicides.

During the early summer of 2017, 3 applications of CalciComplex were applied on a monthly basis at 50g/m², the first on 15.06.17 just after the climatic trigger for Anthracnose spore germination had been identified from local weather data. Two subsequent applications were made on 13.07.17 and 10.08.17. The level of Anthracnose was recorded in the plots and the results are shown below for the CalciComplex treatment vs. a preventative application of Propiconazole made on 06.07.17.



As shown above, the trial results confirm the significant reduction in Anthracnose gained by 3 applications of CalciComplex over the summer period and highlight the increase in efficacy vs. a standard preventative fungicide application.

	CalciComplex®
Granulation	SGN125
Additional information	3.6% humic acid, 17% Ca, 1.8% Mg
Application rate	35 to 70g/m²
Bag size (kg)	25kg
Bag coverage (per hectare)	14 to 28 bags

Usage Period	J	F	M	A	M	J	J	A	S	O	N	D
CalciComplex®		●	●	●	●	●	●	●	●	●	●	

C-Complex® Sport - Organic mineral fertiliser

FOR USE ON GOLF TEES, APPROACHES, FAIRWAYS, SPORTS PITCHES, RACECOURSES AND GENERAL AMENITY TURF

C-Complex® Sport 14-2-5 Key Points

Contains Naturvigor

- For use on coarse turf
- Contains 3 nitrogen sources for improved longevity
- Includes nitrogen derived from ammonium sulphate for good low temperature response
- 100% of potassium derived from organic source for extended release
- 6.3% humic acid and cold-processed seaweed meal

C-Complex Sport 14-2-5+MgO+2CaO is a mineral-organic outfield fertiliser designed for use on coarse turf areas such as sports pitches, golf tees and fairways, racecourses, lawns and general amenity turf.

The homogeneous, regular granule, breaks down easily and is formulated to provide good growth even at low soil temperatures with extended release due to the combination of ammonium, urea and organic nitrogen, alongside organic potassium. Just like the highly successful C-Complex fine turf range, C-Complex Sport 14-2-5+MgO+2CaO is formulated using Naturvigor, a combination of aerobically-composted cow manure and high levels of humic acid.

This results in a finished product that is almost 50% Organic - featuring 6% Humic acid, cold processed seaweed meal and Kali Vinasse, a slow release organic potassium source.

	C-Complex® Sport 14-2-5+MgO+2CaO
Field longevity	8 to 10 weeks
Granulation	SGN240
Additional product contents	6.3% Humic Acid 100% of potassium in organic slow release form
Application rate	25 to 40g/m²
Pack size	25kg
Bag coverage (Per hectare)	10 to 16 bags

Application Notes

For best results, apply to dry foliage after cutting to allow time for the granule to penetrate the sward between cuts. Avoid applying product during prolonged periods of drought and/or frosty weather. Do not apply to drought-stressed turf. Water-in if application is made during dry, hot periods to initiate granule breakdown and nutrient release.

Usage P eriod	J	F	M	A	M	J	J	A	S	O	N	D
C-Complex® Sport		●	●	●	●	●	●	●	●	●	●	

Multiverdo® - Quick release fertiliser

13-0-46 MICRO-PRILLED POTASSIUM NITRATE, IDEALLY SUITED FOR PROMOTING GROWTH AT LOW SOIL TEMPERATURES, RECOVERY AFTER AERATION AND FOR USE IN ANAEROBIC SOIL SITUATIONS

Multiverdo® 13-0-46 Key Points

- 100% potassium nitrate – no carrier
- Easy to see during application
- Nitrate nitrogen for immediate plant availability with no sulphur
- Ideally suited for use in black-layer situations
- Micro-prilled formulation for ease of application and quick dispersal into the sward
- Low application rates for cost-effective use

How Multiverdo® works

Each homogeneous Multiverdo prill contains straight potassium nitrate with no carrier and solubilises quickly on contact with moisture. The white prill is easy to see when applying and the Miniprill formulation ensures adequate coverage, even at low application rates. Once solubilised, Multiverdo breaks down into nitrate nitrogen and potassium ions, without requirement for bacterial conversion in the soil and is therefore immediately available to the grass plant.

Easy application with minimal disruption

The easy to see, white micro-prills make application extremely straightforward and once applied, they quickly dissolve, eliminating pick up problems.

	Multiverdo® 13-0-46
Field longevity	6 to 8 weeks
Granulation	SGN120
Cutting height	Fine Turf
Application rate	10 to 35g/m²
Pack size	25kg
Bag coverage (per hectare)	4 to 14 bags

Usage Period	J	F	M	A	M	J	J	A	S	O	N	D
Multiverdo®			●	●	●	●	●	●	●	●	●	

All the benefits of potassium nitrate are also available as a soluble fertiliser for spray application. See Solufeed High-K on page 16.

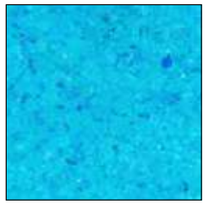
multiverdo®

Solufeed® - Water-soluble fertilisers

FOR USE IN ALL FINE AND COARSE TURF SITUATIONS INCLUDING GOLF AND BOWLING GREENS, TEES, FAIRWAYS, SPORTS PITCHES AND RACECOURSES

How Solufeed works

Solufeed formulations are a blend of water-soluble ingredients including urea, ammonium sulphate, mono-ammonium phosphate, magnesium and chelated micronutrients, designed for spray application.



All formulations also contain a buffering agent to reduce the spray tank pH and thereby aid tank-mix compatibility with other Headland products.

Solufeed® Hi-N 28-7-14+MgO+Micronutrients

- High nitrogen analysis
- Urea, ammonium and nitrate nitrogen for good low and high temperature release
- Excellent solubility
- Fully chelated micronutrient package
- Acid buffering agent for enhanced tank-mixability

Solufeed® Hi-K 13-0-45

- High potassium analysis
- Nitrate nitrogen for good low temperature release
- Excellent solubility
- Sulphur-free formulation – ideally suited for use in anaerobic rootzone situations

***TIP** - Always use a coarse mesh in-line filter when mixing water soluble fertilisers and always add the water soluble fertiliser to the tank first in the mix sequence to give it maximum time to dissolve.*

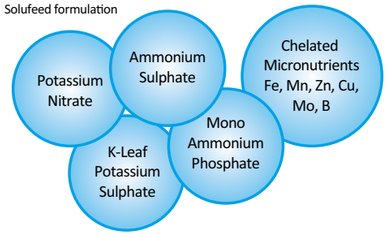
Solufeed® NK 15-0-25 Key Points

- High potassium analysis utilising K-Leaf potassium sulphate and potassium nitrate
- Ammonium, nitrate and urea nitrogen for optimum uptake
- Acidifying formulation
- Excellent solubility
- Acid buffering agent for enhanced tank-mix compatibility

How K-Leaf™ works in Solufeed® 15-0-25

K-Leaf is a fine milled, readily soluble potassium sulphate containing 52% K_2O and 18% sulphur, specially designed for foliar application.

The fine particle formulation ensures rapid solubility compared to other forms of potassium sulphate, with virtually no chloride residue. In addition, K-Leaf exerts an acidifying effect on the spray tank and leaf pH.



	Solufeed®				
	Hi-K 13-0-45	Hi-P 13-40-13 +MgO+Micros	NPK 14-5-28 +MgO+Micros	NK 15-0-25 +MgO	Hi-N 28-7-14 +MgO+Micros
Field longevity	2 to 4 weeks	2 to 4 weeks	2 to 4 weeks	2 to 4 weeks	2 to 4 weeks
Application rate	20 to 60kg/ha	20 to 60kg/ha	20 to 60kg/ha	20 to 60kg/ha	20 to 60kg/ha
Bag coverage (Per Hectare)	1 to 3 bags	1 to 3 bags	1 to 3 bags	1 to 3 bags	1 to 3 bags
Water volume	300 to 600L/ha	300 to 600L/ha	300 to 600L/ha	300 to 600L/ha	300 to 600L/ha
Pack size	20kg	20kg	20kg	20kg	20kg

Usage Period	J	F	M	A	M	J	J	A	S	O	N	D
Hi-K **13-0-45**	●	●	●	●	●	●	●	●	●	●	●	●
Hi-P **13-40-13**			●	●	●	●	●	●	●	●		
NPK **14-5-28**	●	●	●	●	●	●	●	●	●	●	●	●
NK **15-0-25**	●	●	●	●	●	●	●	●	●	●	●	●
Hi-N **28-7-14**				●	●	●	●	●	●	●		

Protec® Plus and Protec® - Liquid fertiliser range

SLOW RELEASE AND CONVENTIONAL LIQUID FERTILISERS FOR ALL TURF SITUATIONS

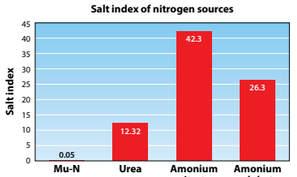
Protec® Plus - Slow release liquid fertilisers

Protec® Plus Key Points

- Slow release liquid fertilisers
- Low salt, methylene-urea based formulations
- Excellent turf safety
- Ideal for use during hotter, summer conditions
- Suitable for spoon feeding, foliar and higher rate liquid applications

Protec® Plus

Protec Plus is formulated from a unique source of liquid slow release methylene-urea which provides key benefits particularly when used during the hotter months of the year.



The source has an extremely low salt index which means that when applied to the plant leaf it has a low potential to draw water from inside the leaf and cause dehydration. This process is known as Osmolarity.

As an example, during the summer of 2018, Protec Plus 28-0-0 was applied at 120L per ha, without supplementary irrigation during 32.5°C heat with no observable leaf scorch.

Owing to the slow release nature of Protec® Plus formulations, it is suggested to commence applications once soil temperatures are ≥ 14°C in order to gain a consistent turf response.

Protec® Plus 28-0-0

Contains 59% slow release nitrogen. Formulated to provide good consistent release characteristics with excellent turf safety and a low salt index. Ideal for spoon feeding at 10-20L per hectare.

Protec® Plus 16-4-8

Contains 28% slow release nitrogen. Formulated to supply a balanced supply of nitrogen, phosphorus and potassium over the summer months. Contains 4 difference types of nitrogen to provide consistent nutrient release.

Protec® Plus 15-0-12

Contains 46% slow release nitrogen. Formulated to provide a balanced supply of nitrogen and potassium over the summer months. Research has shown that it is beneficial to maintain plant leaf tissue levels > 3.6% nitrogen and 2.0% potassium to reduce the risk of Anthracnose Foliar Blight.

Protec® - Conventional liquid fertilisers

Protec® Key Points

- Modular range of analyses to suit all application requirements
- Protec 6-0-12 and Protec 10-0-10 specifically formulated for low temperature application

Protec® 10-0-10

Protec 10-0-10 utilises 28% nitrate nitrogen derived from potassium nitrate for excellent low temperature response. The sulphur-free formulation is ideal where existing soil levels are high.

Protec® 6-0-12

50% of the nitrogen in Protec 6-0-12 is derived from ammonium and nitrate nitrogen for efficient winter response. The sulphur-free formulation is ideal where existing soil levels are high.

Protec® 0-0-25

Derived from potassium thiosulphate, Protec 0-0-25 provides an excellent turf response. This formulation was identified as the optimum potassium source in trials with 20-20-30 mix for maximum plant health during high disease pressure periods.

Usage Period	J	F	M	A	M	J	J	A	S	O	N	D
Protec® Plus **28-0-0**					●	●	●	●	●			
Protec® Plus **16-4-8**					●	●	●	●	●			
Protec® Plus **15-0-12**					●	●	●	●	●			
Protec® **10-0-10**			●	●	●	●	●	●	●			
Protec® **6-0-12**	●	●	●	●	●	●	●	●	●	●	●	●
Protec® **0-0-25**	●	●	●	●	●	●	●	●	●	●	●	●

	Protec® Plus			Protec®		
	28-0-0	16-4-8	15-0-12	10-0-10	6-0-12	0-0-25
Field longevity	2 to 8 weeks	2 to 8 weeks	2 to 8 weeks	3 to 4 weeks	3 to 4 weeks	3 to 4 weeks
Slow Release N content	59%	28%	46%	-	-	-
Application rate Spoon feeding	10 to 20L/ha	10 to 20L/ha	10 to 20L/ha	10 to 20L/ha	10 to 20L/ha	10 to 20L/ha
Application rate Liquid feeding	40 to 60L/ha	40 to 60L/ha	40 to 60L/ha	60 to 100L/ha	40 to 100L/ha	20 to 40L/ha
Water volume	300 to 450L/ha	300 to 450L/ha	300 to 450L/ha	300 to 450L/ha	300 to 600L/ha	300 to 600L/ha
Pack size	10L, 200L and 500L IBC			10L & 200L	10L & 200L	10, 100 & 200L

Plant Health

Non-pesticidal disease management - minimising turf disease

Microdochium nivale

The two key drivers behind the management of *Microdochium nivale* are climatic conditions and legislation and their combined impact has not had greater affect in the turfgrass industry, than in autumn 2018.

Climatic Conditions

Autumn 2018 continued the trend for warmer than usual climatic conditions extending late into the year, with significant peaks of air temperature and humidity in mid-October, mid-November, early December and the week between Christmas and the New Year. The latter was one of the latest periods of the year when not only activity on existing scars but also new infection was noted.

The key driver in many of these peaks of disease activity has been extended periods of leaf wetness due to dew and / or guttation fluid formation with the lack of a drying wind.

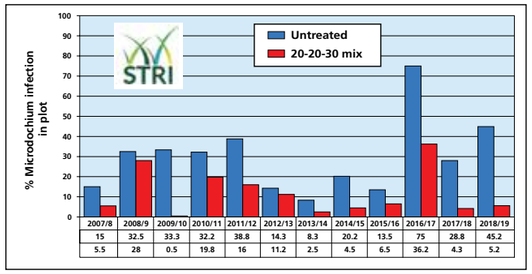
Legislation

The most significant active ingredient lost in 2018 was the contact-curative Iprodione. With its removal from the market turf managers no longer have the ability to control active disease in a reactive manner. This has meant fungicide programs have had to be entirely preventative in nature for the first time, with either systemic and / or contact-protectant chemistries adopted as part of an IPM program.

Non-pesticidal management of *Microdochium nivale* 20-20-30 Mix + Mantle

Against the background of decreased fungicide availability and increased climatic pressure for disease development, Headland Amenity have been developing and improving an effective tank-mix of elicitors, protectants and hardeners formulated to suppress the ingression of disease on the outside and inside of the grass plant. This work began in 2007. The latest tank-mix utilises Liquid Turf Hardener, Turfite, Seamac Proturf together with Mantle, a new product launched in 2018. Trials conducted in 2017/18 and ongoing in 2018/19 have demonstrated the efficacy of this approach with excellent reduction in active M*icrodochium nivale*. This tank-mix combination is designed to compliment a full IPM program that includes fungicides and cultural control of surface organic matter.

Read more about the 20-20-30+Mantle tank-mix on page 20.



	2007/8	2008/9	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19
Untreated	15	32.5	33.3	32.2	38.8	14.3	8.3	20.2	13.5	75	28.8	45.2
20-20-30 mix	5.5	28	0.5	19.8	16	11.2	2.5	4.5	6.5	36.2	4.3	5.2

Note: The S.T.R.I. data shown for 2018/19 is up to the last assessment date 15.12.18 and the trial is ongoing.

1 Mantle 10-20 kg/ha + 2 Liquid Turf Hardener 20L/ha + 3 Turfite® 20L/ha + 4 Seamac Proturf Fe 30L/ha in 400L/ha spray volume

Note: Mantle must always be added to the spray tank first and solubilised over 10-15 minutes ideally with warm water.

Anthracnose – *Colletotrichum cereale*

2017 exhibited a high occurrence of Anthracnose on *Poa annua* golf greens, but the pattern and timing of disease development was subtly different to previous years. The reason was a different pattern of weather across May to August, with a level and duration of heat arriving at the end of May high enough to initiate spore germination some 4-6 weeks earlier than normal. We then experienced high temperatures during the middle of June, peaking in the mid-thirties followed by a breakdown of the weather during July and August with high daily rainfall incidents and high humidity.

The result was that Anthracnose occurred 4-6 weeks earlier than normal, at the beginning of July and in addition, both foliar blight and basal rot symptoms were visible throughout the summer / early autumn.

U.S Research and Best Management Practices

In the U.S. Anthracnose is now a major disease, having risen to a position of prominence behind only Dollar Spot. Rutgers University has been actively engaged in research, putting forward a number of Best Management Practice (BMP's) to reduce its severity. These include;

Balanced nutrition sufficient to promote good, consistent growth - Research showed a reduction in Anthracnose severity by increasing the annual N input from 100kg/ha to 200kg/ha, and by aiming for a summer N input of 5kg/ha on a weekly basis.

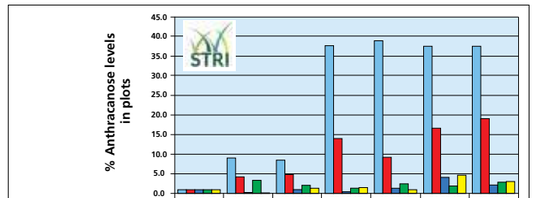
Minimum cutting height - Reduced Anthracnose severity was seen by increasing the cutting height from 2.28mm (0.09") to 3.175mm (0.125").

Sand topdressing - A reduction in Anthracnose was achieved by increasing sand topdressing levels from 46 MT (June to October) to 120 MT.

S.T.R.I Anthracnose Trial Data 2017

Headland conducted an Anthracnose trial at the S.T.R.I in 2017 and looked specifically at the effect of regular nutrition on the severity of the disease, in comparison with the standard practice of applying a preventative fungicide.

The results (shown below) highlight the benefit of consistent, light nutrition through the main disease period and in addition prove that this best management practice is more effective than simply applying a preventative fungicide. Each liquid fertiliser treatment applied approximately 10kg of nitrogen over a two week period.



	15.06.17	29.06.17	13.07.17	28.07.17	10.08.17	24.08.17	08.09.17
Untreated control	1.0	9.0	8.5	37.5	38.8	37.5	37.5
Propiconazole	1.0	4.3	4.8	14.0	9.3	16.8	19.2
Solufeed NPK & Turfite®	1.0	0.3	1.0	0.5	1.3	4.3	2.2
N-Sure, potassium nitrate & Turfite®	1.0	38.8	2.0	1.3	2.5	2.0	3.0
SB Protec NPK + Turfite	1.0	0.0	1.3	1.5	1.0	4.8	3.2

The '20/20/30' strategy - Enhanced Plant Health to minimise disease

FOR USE IN ALL FINE AND COARSE TURF SITUATIONS INCLUDING GOLF AND BOWLING GREENS, TEES, FAIRWAYS, SPORTS PITCHES AND RACECOURSES

The 20/20/30+Mantle tank-mix - Enhanced Plant Health to reduce *Microdochium nivale* activity

Using fungicides to control *Microdochium nivale* is an essential tool in the turf manager's armoury but the options are becoming more limited each year with the loss of effective systemic and contact chemistries in recent years. This decrease in effective pesticide options has increased focus on creating an effective IPM program that is not completely reliant on pesticides.

Effective IPM programs

One of the key components of an effective IPM program is efficient control of surface organic matter, as this is a known contributory factor for disease ingression. Surface moisture held in the upper organic matter layer contributes to an environment that encourages the growth of pathogenic fungi.

Another key component is reducing leaf wetness, either by physical removal, rolling or the use of a surfactant like Dewcure.

Elevated levels of leaf wetness encourage the growth of fungal mycelium both across and between grass plant leaves. Maintaining a drier leaf during what can be short periods of heavy dew formation, tips the balance away from fungal development.

The 20/20/30 + Mantle approach

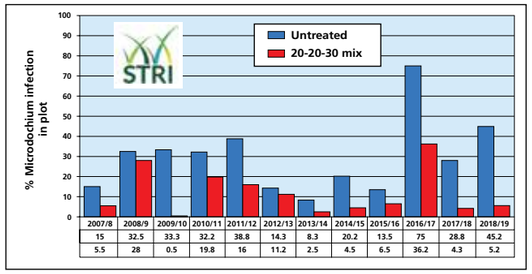
Alongside good cultural work, the use of the 20-20-30+Mantle tank-mix has gained popularity based on many years of successful suppression of *Microdochium nivale* with end-users and in independent trials conducted at the S.T.R.I. The program consists of a 4-way tank-mix of plant protectants, biostimulant and elicitors formulated to change the environment on and inside the grass leaf, with the sole objective of reducing disease ingression.

Mantle is a manganese/zinc formulation combined with the Harpin protein providing protection to the grass plant and stimulating physiological processes within the plant.

The combination of these four products applied prior to the onset of disease, has been shown to effectively suppress *Microdochium nivale* by altering the environment on the surface of the leaf and creating a healthier plant that grows away from the effect of the pathogen. During the main disease period, this tank-mix can be used to supplement disease suppression between fungicide applications and maintain a healthy plant during the autumn and winter period.

Results backed by research (see graph top right)

Based on independent trials carried out at the STRI over the last 11 years and after many years of positive field experience, Headland customers have benefitted from pro-active strategy to maintain surfaces in the autumn. The use of the '20/20/30' mix is now a well-established solution which has shown excellent results and forms the backbone of many late season management programmes. The aim is to reduce the effects of disease occurrence by promoting a healthy, strong plant, which is more resistant to infection.



	2007/8	2008/9	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19
Untreated	15	32.5	33.3	32.2	38.8	14.3	8.3	20.2	13.5	75	28.8	45.2
20-20-30 mix	5.5	28	0.5	19.8	16	11.2	2.5	4.5	6.5	36.2	4.3	5.2

Timing and frequency of application

As with modern-day fungicides, the 20/20/30 approach is far more effective applied preventatively before disease levels ramp up in the autumn. The objective is to ensure that the grass plant is healthy going into this period so typically applications start in September and are repeated on a 2-week basis during active growth periods. As growth levels slow later in the autumn and winter, application frequency can reduce to monthly. Ultimately the determining factor as to how long the grass plant is protected by the 20/20/30 tank-mix is the rate of grass growth and so using daily growth potential (G.P.) as measure is an important guide. Measurement of growth rates in the autumn and winter have shown that an accumulated growth potential figure of 10 is a good marker for both this tankmix and a systemic fungicide.

Liquid Turf Hardener

Calcium, magnesium and nitrate nitrogen based plant protectant

Liquid Turf Hardener Key Points

- Specially formulated foliar plant hardener
- Contains calcium and magnesium in nitrate form
- Rapid uptake formulation technology for a fast response even at low air and soil temperatures
- Ideal tank-mix partner to Seamac ProTurf Fe and Turfite for non-pesticidal disease suppression
- Acid buffered for maximum tank-mix compatibility

	Liquid Turf Hardener
Application rate	20 to 40L/ha
Water volume	300 to 450L/ha
Supplementary irrigation	Not Required
Pack size	10L & 100L

Liquid Turf Hardener is designed to strengthen turf and increase the plant's ability to withstand stress. It may be applied alone or in tank-mixtures with other products. The unique, nitrate based formulation facilitates rapid uptake of the calcium and magnesium into the grass plant, producing a harder, more disease resistant sward. It can be applied all year round.

Usage Period	J	F	M	A	M	J	J	A	S	O	N	D
Liquid Turf Hardener	●	●	●	●	●	●	●	●	●	●	●	●

Turfite® & Seamac® ProTurf Fe - Plant elicitors and protectants

FOR USE IN ALL FINE AND COARSE TURF SITUATIONS INCLUDING GOLF AND BOWLING GREENS, TEES, FAIRWAYS, SPORTS PITCHES AND RACECOURSES

Turfite®

Phosphite and ammonium nitrogen based plant elicitor

Turfite® Key Points

- Rapid uptake formulation technology for a fast response even at low air and soil temperatures
- Acid buffered for maximum tank-mix compatibility
- Ideal tank-mix partner to Liquid Turf Hardener and Seamac ProTurf Fe for non-pesticidal disease suppression
- Ideal tank-mix partner for Seamac Ultra Plus and TeMag Elite to stimulate post stress plant recovery

Phosphite (as opposed to phosphate) is a form of phosphorus that has some unique properties when applied as a fertiliser. It is extremely mobile within the plant and unlike phosphate, does not react with calcium in high pH, alkaline rootzone situations, to be rendered unavailable to the grass plant.

Recent research by Headland Amenity on the mode of action of phosphite has shown a stimulation of both shoot and root growth following application of Turfite suggesting increased plant health is one of the key responses to phosphite application.

	Turfite®
Application rate	20 to 40L/ha
Water volume	300 to 450L/ha
Supplementary irrigation	Not Required
Pack size	10L, 100L & 500L IBC

How to use

Turfite can be used in a tank-mix combination with Solufeed Hi-K and/or Seamac ProTurf Fe to provide a perfect low temperature tonic for the autumn / winter and spring.

In addition, the readily available form of phosphorus in Turfite is ideally suited for use in over-seeding situations and after aeration to stimulate new root development.

Turfite is tank-mix compatible with most Headland liquid products and many turf fungicides. (Please contact Headland for further details).

Usage Period	J	F	M	A	M	J	J	A	S	O	N	D
Turfite®	●	●	●	●	●	●	●	●	●	●	●	●

Seamac® ProTurf Fe

Chelated iron and seaweed based plant protectant

Seamac® ProTurf Fe Key Points

- 6% chelated iron with magnesium and sulphur for optimum winter colour
- Rapid uptake formulation technology for a fast response even at low air and soil temperatures
- Ideal tank-mix partner to Liquid Turf Hardener and Turfite for non-pesticidal disease suppression
- Acid buffered for maximum tank-mix compatibility
- Ideal tank-mix partner for Clipless NT plant growth regulator
- Cost effective winter tonic

Seamac Proturf Fe features a unique formulation enhanced with Elevate Fe to maximise speed of iron uptake and produce a more natural, longer-lasting colour. By using multiple forms of iron, Seamac Proturf Fe offers a rapid green up after application with less staining of the leaf surface. The unique formulation chemistry of Seamac Proturf Fe is important not only for stability and tank-mix compatibility, but also to provide acidification on the leaf surface in order to discourage pathogenic fungal growth. Trials results in the field and also in the laboratory have shown Seamac Proturf Fe provides the optimum iron formulation for suppression of *Microdochium nivale*.

	Seamac® ProTurf Fe
Application rate	20 to 30L/ha
Water volume	300 to 450L/ha
Supplementary irrigation	Not Required
Pack size	10L, 100 & 200L

Usage Period	J	F	M	A	M	J	J	A	S	O	N	D
Seamac® ProTurf Fe	●	●	●	●	●	●	●	●	●	●	●	●

TeMag™ Elite

Water-soluble, chelated micronutrients with Harpin™ plant elicitor

FOR USE IN ALL FINE AND COARSE TURF SITUATIONS INCLUDING GOLF AND BOWLING GREENS, TEES, FAIRWAYS, SPORTS PITCHES AND RACECOURSES

TeMag™ Elite Key Points

- Water soluble micronutrients with Harpin and Iron
- Harpin Plant Elicitor stimulates plants natural defence mechanisms
- Uses Elevate Fe as new iron source - prevents staining and wheel marks
- Research indicates natural suppression of *Microdochium nivale* and Dollar Spot (*Sclerotinia homeocarpa*)
- Tank-mixable with fungicides, liquid fertilisers and biostimulants

TeMag™ Elite water soluble iron and micronutrient package contains Elevate Fe, Headland's complexed iron formulation. The chemical structure of the iron prevents it oxidising after application so it is non-staining with no risk of wheel marking when applied at the manufacturer's suggested rates. It is also fully tank-mixable with liquid fertilisers, biostimulants and pesticides including many currently available fungicides.

Backed by research

Headland work carried out over the last 10 years has shown that some, but not all forms of iron can help reduce the level of disease within a grass sward. TeMag™ Elite has been formulated using one of the most effective iron sources found as a result of these investigations. The studies have shown positive results with both *Microdochium nivale* and *Sclerotonia homoeocarpa* (Dollar Spot) populations.

	TeMag™ Elite
Application rate	6kg/ha
Water volume	300 to 450L/ha
Supplementary irrigation	Not Required
Pack size	6kg

Usage Period	J	F	M	A	M	J	J	A	S	O	N	D
TeMag™ Elite	●	●	●	●	●	●	●	●	●	●	●	●

Mantle®

Water-soluble manganese, zinc, magnesium and Harpin Protein Elicitor combination

FOR USE IN ALL FINE AND OUTFIELD TURF SITUATIONS INCLUDING GOLF AND BOWLING GREENS, TEES, FAIRWAYS, SPORTS PITCHES AND RACECOURSES

Mantle® Key Points

- Water-soluble manganese, zinc and magnesium with Harpin
- Harpin Plant Elicitor stimulates plants natural defence mechanisms
- For foliar application (uptake mechanism of the Harpin protein)
- Manganese has a potential two-fold benefit to the grass plant
- Tank-mixable with fungicides, liquid fertilisers and biostimulants

As well as an important component of two enzymes, manganese is also an activating co-factor for a large number of enzymes required for key functions in the grass plant. It is involved in the process of lignin synthesis in the root and research has shown that applications of manganese can reduce the ability of some root pathogens like Take All Patch, to cause damage. As essential secondary and micronutrients respectively, magnesium and zinc are also involved in the fundamental processes for a healthy plant, namely photosynthesis and protein synthesis.

	Mantle®
Application rate	5 to 10kg/ha (Outfield turf)
	10 to 20kg/ha (Fine turf)
Water volume	300 to 400L/ha
Supplementary irrigation	Not Required
Pack size	5kg
Bag coverage (per hectare)	1 to 4 bags

Usage Period	J	F	M	A	M	J	J	A	S	O	N	D
Mantle®	●	●	●	●	●	●	●	●	●	●	●	●

Plant Health tank-mixes

INFORMATION

Tank-mixing is a key part of modern turf management saving time and in some cases increasing the efficacy of the applied mix in terms of obtaining a positive plant response.

Headland conduct a comprehensive assessment of a tankmix in the laboratory to assess physical compatibility, in the field to assess biological compatibility and in research trials to assess the synergistic benefits.

The following tank-mixes have been tested using all these criteria;

Stress Reduction, Plant Recovery and High Disease Pressure Tank-mix.

Stress Reduction

By combining the bioactive seaweed and humic acid combination of Turfcomplex with the proven surfactant benefits of Tricure AD, this tank-mix ensures a reduction in plant stress.

1 **Tricure AD™** 10 to 20L/ha + 2 **Turfcomplex** 20 to 40L/ha in **400 to 600L/ha Spray solution**

Plant Recovery

When the grass plant is weak during periods of climatic and / or biotic stress, this tank-mix maximises recovery and plant health.

1 **Seamac® Ultra Plus** 10 to 20L/ha + 2 **TeMag™ Elite** 6kg/ha + 3 **Turfite®** 20 to 30L/ha in **400L/ha Spray solution**

High Disease Pressure Tank-mix - *Microdochium nivale*

With more warmth and humidity carrying later on into the autumn / winter, disease pressure from *Microdochium nivale* is a growing threat to fine turf and coarse turf areas. This tank-mix is backed by 11 years of independent research in terms of suppressing disease activity using a combination of protectants, hardeners and elicitors.

1 **Liquid Turf Hardener** 20L/ha + 2 **Turfite®** 20L/ha + 3 **Seamac® Proturf** 30L/ha in **400L/ha Spray volume**

New for 2019, Mantle® can be added to this tank-mix at 10 to 20kg per hectare to maximise suppression...

Seamac® Ultra Plus - Bioactive Seaweed + Proactin[EX]

FOR USE IN ALL FINE AND COARSE TURF SITUATIONS INCLUDING GOLF AND BOWLING GREENS, TEES, FAIRWAYS, SPORTS PITCHES AND RACECOURSES

Seamac® Ultra Plus Key Points

Contains Proactin[EX]

- Liquid seaweed, now with Proactin[EX] biostimulant package
- 100% plant-derived formulation
- Cold-extracted seaweed provides high levels of bioactive plant growth hormones
- Improves stress resistance in turf and aids recovery
- Tank-mixable with other Headland products

About Proactin[EX]

New formulation Seamac Ultra Plus contains Proactin[EX] , a patented, plant-derived biostimulant package, containing L-form amino acids, B-Complex vitamins and antioxidants.

To enable a rapid plant response and help improve uptake, Proactin[EX] utilises express technology - a patented formulation using SAR compounds and a transcuticular nutrient delivery system.

Formulated by research

Proactin[EX] has been trialled in the US at Rutgers University, to assess its ability to promote tolerance to heat, drought and salinity stress in turfgrass.

(Huang, Dr. Bingru and Burgess, Patrick, Rutgers University, 2011)

To view the research data visit - **http://tinyurl.com/proactin**

Amino acid content

The benefits of using seaweed extracts in foliar and root drench applications are well established on sports turf. Seamac Ultra Plus aims to build on these benefits by providing additional L-Form, plant-available amino acids, vitamins and antioxidants. Amino acids are involved in numerous functions that facilitate healthy growth, including shoot and root development, nitrogen transfer within the plant and chlorophyll production.

Enhanced growth in stress situations

When a plant is growing normally it uses energy produced during the photosynthetic process to produce amino acids. However when it is under stress, the efficiency of this process can be severely reduced, leading to a decrease in the amount of amino acids produced. Application of amino acids from an external source, (e.g. Seamac Ultra Plus) stimulates growth and recovery when a plant is under stress by providing the building blocks necessary to facilitate this growth. This allows growth of new shoots and roots without the need for the grass plant to expend energy that is already in short supply.

In nature, stress can be either abiotic (non-living e.g. weather related) or biotic (living e.g. plant pathogens). The main benefits of using Seamac Ultra Plus have been observed during drought conditions or when the plant is affected by a pathogen, such as plant parasitic nematode species or more recently, a new pathogen seen in 2012, *Oscillatoria spp*, a type of blue-green algae. Applied in combination with Turfite and TeMag™ Elite (plant elicitors), Seamac Ultra Plus facilitates good growth and recovery for the stressed grass plant.

	Seamac® Ultra Plus	
Application type	Foliar	Root Drench
Application rate	10 to 20L/ha	10 to 20L/ha
Water volume	200 to 400L/ha	450 to 600L/ha
Supplementary irrigation	Not Required	Irrigate to move product into rootzone
Pack size	10 & 100L	10 & 100L

Usage Period	J	F	M	A	M	J	J	A	S	O	N	D
Seamac® Ultra Plus		●	●	●	●	●	●	●	●	●	●	

Turfcomplex® - Bioactive seaweed + humic acids, micronutrients and elevated manganese

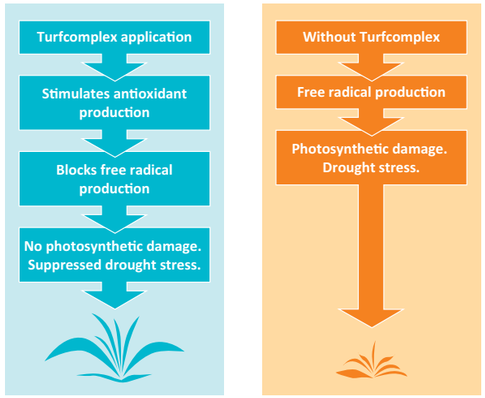
FOR USE IN ALL FINE AND COARSE TURF SITUATIONS INCLUDING GOLF AND BOWLING GREENS, TEES, SPORTS PITCHES AND RACECOURSES

Turfcomplex® Key Points

- Liquid biostimulant featuring seaweed extracts and humic acids
- Contains Algifol® bioactive seaweed for high levels of growth stimulants
- Helps reduce stress and improve plant health
- Aids disease resistance
- Use in combination with TriCure AD wetting agent, for a complete stress management program in hot, dry weather
- Elevated levels of chelated manganese for enhanced root strength

Synergistic formulation

Turfcomplex exploits the synergistic effect of Algifol - a cold temperature manufactured bioactive seaweed, combined with high levels of plant active humic acids to meet the twin objectives of improved root mass and reduced plant stress. When a plant is under stress, toxic molecules known as free radicals can be produced, which if left to accumulate, damage plant pigment production causing bleaching and cell membrane damage. Research has shown that application of a bioactive seaweed in combination with humic acid can stimulate the plant to produce antioxidants that prevent the accumulation of free radicals by reacting with them to produce non-harmful compounds.



High humic acid content

Turfcomplex contains high levels of humic and fulvic acids in order to promote root growth and reduce plant stress. At 40 litres per hectare, Turfcomplex applies the research identifed optimum rate of 1.75kg/ha of Humic Acid.

Elevated manganese content for enhanced root strength and disease suppression

Manganese availability has been linked with a number of turfgrass diseases, notably Take-All Patch and latterly Grey Leaf Spot. These diseases are thought to convert manganese to a form that is unavailable to the plant and in so doing, increase the plant's susceptibility to disease.

Manganese is linked to lignin biosynthesis and therefore low levels in the root may limit root lignin content and thereby increase the plants susceptibility to root diseases, like Take-all. Turfcomplex is formulated to apply 0.37kg of Mn/ha @ 20L/ha.

Fully chelated micronutrient package

Turfcomplex contains a full spectrum of micronutrients in EDTA chelated form to maximise availability in alkaline rootzones. Chelates are compounds that bind tightly to specific nutrient molecules and thereby prevent them from reacting with other elements in the soil and becoming unavailable.

	Turfcomplex®	
Application type	Foliar	Root Drench
Application rate	20 to 40L/ha	20 to 40L/ha
Water volume	300 to 400L/ha	450 to 600L/ha
Supplementary irrigation	Not Required	Irrigate to move product into rootzone
Pack size	10 & 100L	10 & 100L

Usage Period	J	F	M	A	M	J	J	A	S	O	N	D
Turfcomplex®			●	●	●	●	●	●	●			

Take-all disease

Elevate Fe® - Non-staining, complexed liquid iron

FOR USE ON ALL COARSE & CLOSE-MOWN AREAS INCLUDING RACECOURSES, SPORTS PITCHES, GOLF COURSE TEES, APPROACHES, FAIRWAYS AND SEMI-ROUGH

Elevate Fe® Key Points

- Non-staining complexed iron formulation
- Clean, ready to use liquid
- No blackening or wheel marks
- Mixes easily with Clipless NT PGR and liquid fertilisers
- Pack sizes: 200/750/1,000L

Elevate Fe is a new, cost-effective, liquid formulation of iron for use on outfield turf. Unlike most iron plus nitrogen formulations, the iron in Elevate Fe is chemically-bonded to the nitrogen and this imparts some unique characteristics when applied to turf.

Non-staining, safe formulation

Most iron formulations leave a black residue on the leaf evident after application, particularly on high traffic areas, wheel marks and where the spray boom has travelled closer to the turf. Application of Elevate Fe does not result in staining to the turf, allowing applications to be made right up to key events. In addition, this allows for safe applications with less plant stress through desiccation and no leaf tip scorch.

Rapid plant uptake

The nitrogen-iron complex facilitates fast uptake into the plant for a rapid green-up after application and long-lasting results. Application of Elevate Fe at 20 litres per hectare applies just over 1.5kg N/hectare.

	Elevate Fe ®
Application rate	20 to 40L/ha
Water volume	300 to 450L/ha
Supplementary irrigation	Not required
Pack size	200, 750 & 1,000L

Usage Period	J	F	M	A	M	J	J	A	S	O	N	D
Elevate Fe	●	●	●	●	●	●	●	●	●	●	●	●

Non-reactivity in the spray tank

Elevate Fe does not exhibit the usual type of reactivity normally associated with iron when used as a tank-mix component (see Fig. 1). The iron in Elevate Fe is bound in a nitrogen complex preventing adverse reaction with other tank-mix components. This means it is suitable for mixing with water-soluble, liquid fertilisers and plant-growth regulators.

When standard iron is mixed with a phenoxy herbicide often a reaction occurs and a thick precipitate is formed, rendering the tank-mix useless and impossible to spray out. Elevate Fe does not demonstrate the same issues when added to Quickfire herbicide. In limited field trials the two products were successfully combined and sprayed out with no issues.

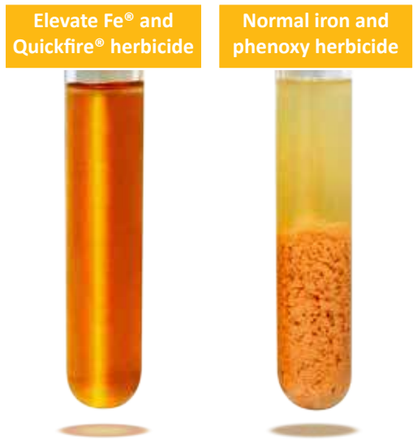


Fig. 1. Results of reactivity when Elevate Fe is used as a tank-mix component with Quickfire herbicide compared to normal iron and phenoxy herbicide.

Tank-mix for outfield colour with TriCure AD™ wetting agent

We investigated the feasibility of combining Elevate Fe, XTEND Soluble 46-0-0 and Tricure AD, at the outfield rate of 2.5L/hectare. The rationale being to apply in the morning, leave the tank-mix on the leaf to enable the XTEND Soluble and Elevate to be absorbed and then water in using irrigation in the evening.

During trials the mix was left on the grass plant for 4 consecutive days when the air temperature topped 30°C. Following irrigation, no phytotoxicity (leaf scorch) was evident and the plant response from the fertiliser, iron and soil surfactant was excellent.

Outfield Green up with Wetting Agent
Tees, Fairways, Semi-Rough and Sports Pitches

1. XTEND® Soluble **20-40kg/ha** + 2. TriCure AD™ **2.5L/ha** + 3. Elevate Fe® **20L/ha**

in **400L/ha spray volume**

Applications from Mid-April. Irrigation or rainfall required.

Naturvigor - Composted cow manure and humic acid soil conditioner

FOR USE IN ALL COARSE TURF SITUATIONS INCLUDING GOLF TEES, FAIRWAYS, SPORTS PITCHES AND RACECOURSES

Naturvigor Key Points

- Fairway grade formulation
- 1-1-1 analysis with added iron and micronutrients
- Free-flowing granule, easy to apply, with rapid particle breakdown
- Humic acid content aids root development and germination
- Fully composted for maximum benefit to soil
- Improves soil nutrient retention and maximises fertiliser efficacy
- Ideal for use during renovation and overseeding

The high organic matter (32.5%) and humic acid (18.1%) content make this product ideal for use on impoverished, sandy soils. Naturvigor also contains a comprehensive range of micronutrients.

The 1% iron content is complexed by humic acids to ensure long-term availability.

Aerobic composting

A two-stage composting process is used to produce Naturvigor. Firstly, the cow manure is turned frequently, over a period of 5 to 7 months to input oxygen, regulate temperature and encourage aerobic decomposition. Then the final phase of composting takes place under cover, to protect the beneficial bacteria present from the harmful effects of UV rays.

Humic acids with a high fulvic acid fraction (for maximum availability) are then added to the mixture prior to granulation.

The effects of using Naturvigor

Application of Naturvigor imparts a number of benefits to impoverished soils including:

- Improved organic matter recycling (by introducing actinomycetes, the micro-organisms responsible for thatch breakdown)
- Increased nutrient retention, thereby maximising the effects of fertiliser applications
- Increased soil microflora

Where to use Naturvigor

Naturvigor can be used for application to golf course fairways, semi-rough and rough areas and also on winter season pitches, race courses, polo grounds and in professional lawn care.

The product is ideal for use during spring and autumn renovation and overseeding.

Unlike ordinary composted green waste material, the free-flowing particles of Naturvigor are easily spread using conventional spreaders and are ideally suited for application through Vicon and Amazone fairway equipment.

	Naturvigor
Field longevity	4 to 8 weeks
Granulation	SGN340
Additional product contents	18% Humic Acid
Application rate	35 to 50g/m²
Pack size	25kg
Bag coverage (per hectare)	14 to 20 bags

Usage Period	J	F	M	A	M	J	J	A	S	O	N	D
Naturvigor			●	●	●	●	●	●	●	●	●	

Headland Soluble Iron

Fully water-soluble sulphate of iron

FOR USE IN ALL COARSE TURF SITUATIONS INCLUDING GOLF TEES, FAIRWAYS, SPORTS PITCHES AND RACECOURSES

Headland Soluble Iron Key Points

- High quality water-soluble iron contains 20% Fe
- Highly soluble formulation for easy mixing
- Application in low water volumes
- Cost effective tank-mix partner to liquid and water-soluble fertilisers

There are many grades of soluble iron on the market, but this product demonstrates superior solubility in water volumes as low as 300 litres per hectare.

Application notes

Apply after cutting to avoid removing the product from foliage. Applications made early or late in the season, when soil moisture levels are high, at the light or normal rate, do not require supplementary irrigation. Avoid applying product during frosty weather or when frost is anticipated.

	Headland Soluble Iron
Application rate	8 to 20kg/ha
Water volume	300 to 600L/ha
Supplementary irrigation	Not required
Pack size	25kg

Usage Period	J	F	M	A	M	J	J	A	S	O	N	D
Headland Soluble Iron	●	●	●	●	●	●	●	●	●	●	●	●

DewCure™ - Long term dew control

A LONG-LASTING, DEW CONTROL PRODUCT, SPECIFICALLY FORMULATED TO REDUCE THE ACCUMULATION OF SURFACE MOISTURE ON TURF, INCLUDING DEW, GUTTATION FLUID AND LIGHT FROST

DewCure™ Key Points

- Reduces leaf moisture, suppressing dew and guttation fluid formation
- Enhanced longevity over conventional dew suppressants
- Faster drying times following rain or irrigation
- Drier surfaces can result in less disease
- Quicker recovery from frost
- Reduced labour and drier cutting
- Pack size: 10 litres

DewCure forms a water-resistant, rainfast coating on the leaf surface that suppresses the formation of moisture in the form of dew or guttation fluid.

Guttation fluid

Guttation fluid is water secreted on to the surface of leaves through specialized pores, known as hydathodes. The process occurs most frequently during conditions of high humidity when the rate of transpiration is low. Drops of water found on grass in early morning are often the result of guttation, rather than dew. (Guttation should not be confused with dew, which condenses from the atmosphere onto the plant surface).

Longevity

The longevity of DewCure is a function of two main factors - the rate of mowing frequency (removing leaf tissue treated with DewCure) and the growth rate following application.

Best results are obtained prior to or during colder spells of weather when the level of clipping removal and new growth / leaf formation is at its lowest. Trials have shown that DewCure provides from 1 week to 3 weeks longevity depending on the factors mentioned above.

DewCure is classified, labelled and supplied in accordance with the CLP European regulation No. 1272/2008 and REACH European Regulation No 1907/2006.

Frost

DewCure increases the formation of ice crystals on the plant leaf rather than in or on the soil surface and because the ice crystals are affected by air and not soil temperature, frost may disappear quicker from treated areas.

Disease reduction

The activity of damaging foliar diseases like Fusarium Patch *(Microdochium nivale)* and Dollar Spot *(Sclerotinia homoeocarpa)* is positively linked with conditions conducive to high leaf moisture levels and therefore by reducing this level, disease activity is suppressed. DewCure can be used on all types of turf including golf greens, approaches, tees and fairways, cricket squares and winter sports pitches.

Application notes

It is important not to exceed the water volume shown and to apply to dry turf. Allow DewCure to thoroughly dry on the leaf surface prior to irrigation or rainfall.

- Always maintain a 1.5% dilution rate (e.g. 6L DewCure in 400L water).
- Use standard flat fan nozzles to apply.
- Apply when wind drift is minimal.
- Do not apply through irrigation systems.
- Leave a minimum of 14 days between treatments.
- Do not apply to stressed grass, particularly saturated (waterlogged) or thatchy turf or when heavy frost is expected.

	DewCure™
Application rate	6L/ha
Water volume	400L/ha

DewCure™ - Long term dew control

KEEPING SURFACES DRIER TO HELP REDUCE DISEASE INCIDENCE

DewCure™ maintains dry surfaces prior to aeration and top-dressing

All aspects of aeration and top-dressing become more difficult if the operations have to be carried out on wet greens. Top-dressing sticks to the leaf instead of moving down into the turf surface and causes damage to mower cutting blades. In addition, core harvesting is both a longer and messier process when the turf surface is damp or wet.

Using DewCure before aeration or topdressing can reduce the problems associated with the process by eliminating turf moisture caused by dew and guttation. The drier surface allows faster and cleaner aeration and quicker return to ideal playing conditions after topdressing by enabling sand to better work into the turf canopy, rather than sticking to the leaf.

Application

Use DewCure at its normal rate of 6L/ha in 400L of water (It is important to maintain a 1.5% dilution).

Make a pretreatment application 1 to 2 days before aeration and/or topdressing.

The shorter the interval between application and aeration, the better the results.

DewCure will continue to suppress dew and frost for a period of time after the operation (duration will be dependent on grass removal by mowing and / or new growth emergence).

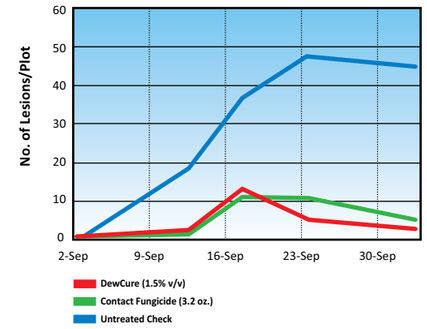
Conclusive DewCure research data

It is clear that surface moisture plays an important part in the 'disease triangle' of host - pathogen - environment. Adapting the environment by maintaining drier turf, especially in times of expected disease pressure, helps to reduce the incidence of disease. Field trials and end-user feedback in the UK and Ireland have indicated slower establishment of *Fusarium* and lower incidence through the susceptible periods of the year when using DewCure. DewCure has also undergone extensive university trials in the U.S. that highlight its ability to help minimize the impact of turf disease.

The product's effect upon the incidence of Dollar Spot was investigated at Ohio State University.

Dollar Spot putting green study

Autumn 2008 - Boehm, et. al. Ohio State University



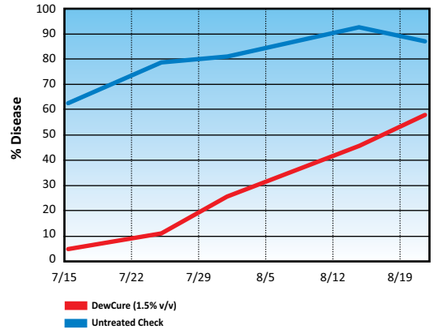
DewCure was significantly different from untreated check on all dates.
All applications made at 14 day intervals beginning September 2.

DewCure significantly suppressed dollar spot by 75% or more during the course of the study when compared to the untreated control. The level of control provided by DewCure in this trial was statistically the same as the level of control provided by the standard contact fungicide included in the study. The authors noted no difficulty mixing or spraying DewCure and no phytotoxicity was observed.

In a second study, levels of anthracnose were measured after applications of DewCure.

Anthracnose putting green study

2008 - Clarke, et. al. - Rutgers University



DewCure is significantly different from untreated control on all dates.
DewCure applications made at 14 day intervals beginning July 15.

In the absence of any fungicides, an adequate level of control (i.e. less than 10% disease) was observed in the DewCure treated plots early in the disease cycle at a time when the level of disease in the untreated checks (60%) had far exceeded an acceptable level. Although the level of disease rose in the DewCure treated plots over the course of the summer, it never reached the level of disease in the untreated checks and remained significantly lower on all sampling dates.

Plant Health

Dealing with Nematode Stress - Information

INTENSIVELY MANAGED TURF IS HIGHLY SUSCEPTIBLE TO STRESS, ESPECIALLY IN OUR EVER-CHANGING AND OFTEN EXTREME NORTHERN CLIMATE

Pathogenic nematodes have become a real issue in the European turf industry since the first symptoms of turf damage by plant parasitic nematodes (PPN's) were noted in 1997 by Mark Hunt, Technical Director of Headland Amenity.

The cause was subsequently identified by Kate Entwistle (The Turf Disease Centre) and confirmed by research undertaken by Colin Fleming (Queen's University, Belfast). The culprit was *Meloidogyne minor*, a new species of rootknot nematode that primarily infected creeping bentgrass greens and perennial ryegrass sports pitches. Over the last 5 to 10 years, numerous other types of PPN's have been discovered in the UK and Europe, affecting both established and new rootzone turf. Among them, Root Gall *(Subanguina radicicola)*, Cyst *(Heterodera spp.)*, Spiral *(Helicotylenchus spp.)* and Stunt *(Tylenchorhynchus spp.)* nematodes have proved the most destructive. The activity of the nematode is mainly focussed on the root system. Whether the organism is an endoparasitic species (living within the root), like the Root-Knot nematode (Fig.1) or an ectoparasitic species (living outside of the root), like the Spiral nematode (Fig.2), the net effect is that the normal function of the root is compromised.

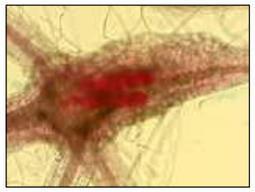


Fig 1 - Endoparasitic Root-Knot nematodes inside a Creeping Bentgrass root.

Fig 2 - Ectoparasitic Spiral nematodes attacking a Perennial Ryegrass root.

Stress management

Plant parasitic nematodes reduce the efficacy of the root system in terms of nutrient and water uptake, but there are often no visible symptoms. Typically, symptoms of nematode damage are absent until the grass plant suffers some form of stress. For example;

1. Environmental Stress - drought, high evapotranspiration (E.T), low light levels, poor growing conditions.
2. Cultural - reduced cutting height, heavy verticutting / Graden usage, incorrect roller usage.
3. Nutrient - insufficient or excessive nitrogen fertility regime.
4. Pathogen complex - the grass plant is already weakened by the action of a pathogenic fungus.

Pre-stress conditioning - maximising plant health prior to stress

For many years, seaweed biostimulants have been utilised on turf, but it wasn't until recently that research identified the exact, beneficial mechanism of these materials on the grass plant. It is now known that an application of the correct type and quantity of biostimulant, stimulates production of antioxidants which in turn decrease free radical activity, minimising damage to the plant cells. Use of biostimulants can be beneficial in managing plant stress symptoms and in particular nematode stress. Research has highlighted a synergism between the use of cold temperature extract seaweeds and the correct input level of humic acid. Headland Amenity have used these research findings as the basis for their biostimulant - Turfcomplex (featured on page 20) and suggest applying this product in combination with TriCure AD soil surfactant on a monthly basis, beginning in March.

Post Nematode damage - Managing a grass sward showing Nematode damage

If a plant is already damaged by stress, there is a need to try to stimulate recovery of new root and shoot tissue. As with pre-stress conditioning, there are a number of materials that help achieve this, either by providing the building blocks of plant growth, (the case with amino acids), or by stimulating the plant's natural defence mechanism (SAR) using plant elicitors such as Harpin or Phosphite. To achieve recovery from stress it is important that along with applications of such materials, the correct cultural processes are adopted to increase the plant's recuperative ability. Both these areas are dealt with in depth in the technical article available from Headland Amenity - 'Dealing with Nematode Stress'.

Typical turf damage by pathogenic nematodes

Suggested pre-stressed treatment.	Turfcomplex	TriCure AD™
Application type	Biostimulant	Soil Surfactant
Application rate	20 to 40L/ha	7 to 14L/ha
Water volume	300 to 600L/ha	300 to 600L/ha
Supplementary irrigation	Irrigate tank-mix off leaf into rootzone	
Pack size	10 & 100L/ha	10 & 100L/ha

Suggested post-stressed treatment.	Seamac" Ultra Plus	Turfite®	TeMag™ Elite
Application type	Biostimulant	Plant Elicitor	Plant Elicitor
Application rate	10 to 20L/ha	30L/ha	6kg
Water volume	300 to 450L/ha	300 to 450L/ha	300 to 450L/ha
Supplementary irrigation	Leave tank-mix on leaf		
Pack size	10 & 100L/ha	10 & 100L/ha	6kg

Amenity Chemicals

headland AMENITY PRODUCTS

Disease management

INFORMATION

With the two formidable challenges of legislation and a changing climate facing our industry, successful turf disease management is set to become a key issue for the future. Formulating a strategy should not be based on fungicidal products alone as the severity and impact of diseases like *Microdochium nivale* is also affected by other factors. These include the overall health of the grass plant, its level of nutrition, surface organic matter and the presence of leaf moisture (dew and guttation fluid) to name but some.

11 years ago Headland Amenity started working on a non-fungicidal approach to *Microdochium nivale* management to compliment the use of fungicides in the field. Trialled independently at the Sports Turf Research Institute (S.T.R.I.) this approach has since developed into a disease management strategy using targeted applications of preventative fungicides interspersed with a non-pesticidal tank mix to maximise disease suppression.

Using weather data to make proactive decisions on disease management

A key feature of a modern-day IPM program is to monitor the likely longevity of both non-pesticidal and pesticidal applications according to grass growth rates as predicted by Growth Potential (G.P). Headland Amenity have developed Weathercheck and a specific turf-related module, 'Meteoturf' that predicts upcoming daily G.P according to a 7 day forecast provided by Meteoblue. This allows the end-user to calculate the potential longevity of an application and also determine application timing if an uptake peak is identified.

Microdochium nivale on *Poa annua*

Each year our knowledge base grows with respect to implementing an effective IPM program. The learning curve is a steep one when you consider the loss of effective fungicidal formulations and the milder, more humid air experienced later in the season.

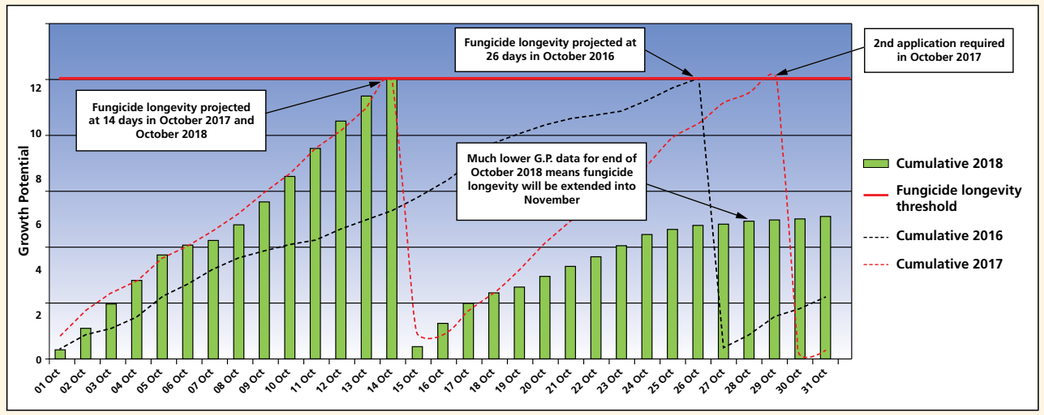
The big 'learn' of autumn 2017 related to the longevity of pesticidal and non-pesticidal applications during periods of strong growth with a cumulative G.P figure of 10 providing a good indicator as to their effective longevity. With mild, humid weather experienced in both October 2017 and 2018 at the mid-point of the month, this translated to an effective longevity of 14-17 days depending on location. In practice this meant systemic fungicide applications were required every 14 days through this period to maintain suppressive pressure on disease.

The latter part of October 2018 was cooler and this extended fungicide longevity into November. However, we saw re-occurring, strong disease pressure during both November and December 2018 which meant an increased requirement for both non-pesticidal and pesticidal applications.

Cumulative Growth Potential - October 2018 vs. 2017 vs. 2016

Location, Thame, Oxfordshire, U.K.

(Model assumes 1st application made on October 1st).



Dedicate® - Turf fungicide

CONTACT AND SYSTEMIC FUNGICIDE FOR A WIDE RANGE OF TURF DISEASES

Dedicate® Key Points

MAPP 17003. Dedicate contains 200g/l tebuconazole and 100g/l trifloxystrobin

- Preventative and early curative disease control
- Diseases controlled include: Fusarium Patch, Red Thread, Dollar Spot and Leaf Spot
- Reduction in Anthracnose and Rust
- Contact and systemic turf fungicide
- Dual action protects turf inside and out
- Low dose application
- Pack size 250ml – treats 2500m²

Where to use Dedicate®

Dedicate is approved for use on all turf areas including: golf greens, tees and fairways, sports turf, commercial and residential lawns, parks, bowling greens and cricket pitches.

When to use

Dedicate should be used preventatively or as early as possible when signs of disease occurs. It can be used on dormant or actively growing grass and will act as a protectant with some curative activity.

Turf Diseases controlled

Diseases controlled include Fusarium Patch (*Microdochium nivale*), Red Thread (*Laetisaria fuciformis*), Dollar Spot (*Sclerotinia homoeocarpa*) and Leaf Spot (*Helminthosporium spp*). Reduction in Anthracnose (*Collectotrichum spp*) and Rust (*Puccina spp*).

How to use

Add the required quantity of Dedicate to a half filled spray tank with the agitation system in operation and fill to the required level. Continue agitation at all times during spraying. Spray immediately after mixing.

If grass is being mown, Dedicate should be applied after cutting and further mowing should not take place until at least 48 hours after treatment. This will allow adequate movement of the product throughout the plant. Allow 28 days between applications of Dedicate.

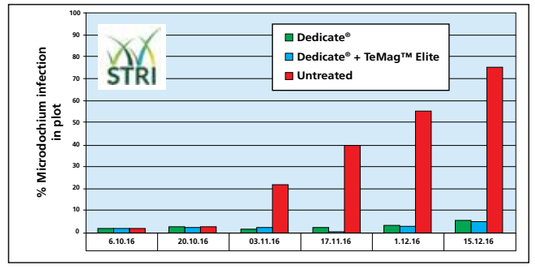
Maximum number of treatments is 4 per year.

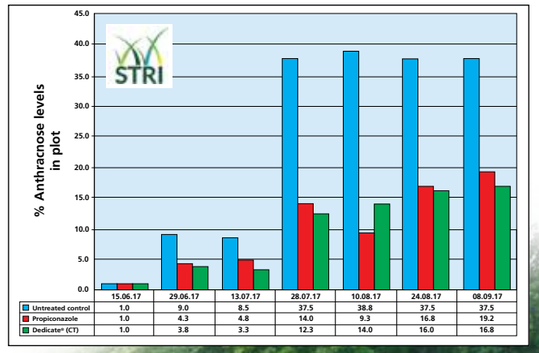
Resistance management

The use of Dedicate should conform to resistance management strategies such as rotation with products containing active ingredients with different modes of action or limiting the total number of applications per season. It is recommended not to apply more than 2 sequential applications of Dedicate or any product containing a QoI fungicide. Alternate with fungicides having different modes of action and do not apply more than 4 applications per year of any product containing a QoI fungicide. Please ask Headland Amenity for specific advice.

Application rates

	Vehicle-mounted hydraulic sprayer	Knapsack Sprayer
Amount of Dedicate®	1L/ha	10ml/100m²
Amount of water	400 to 500L/ha	4 to 5L/100m²





Dedicate® contains 200 g/L (18.2% w/w) tebuconazole and 100 g/L (9.10% w/w) trifloxystrobin. USE PLANT PROTECTION PRODUCTS SAFELY. ALWAYS READ THE LABEL AND PRODUCT INFORMATION BEFORE USE. PAY ATTENTION TO THE RISK INDICATIONS AND FOLLOW THE SAFETY PRECAUTIONS ON THE LABEL. (MAPP 17003)
Dedicate® is a registered trademark of Bayer CropScience Limited.
Packshot for illustration purposes only, pack may vary.

Exteris® Stressgard™ - Turf fungicide

NEW CHEMISTRY SYSTEMIC FUNGICIDE

Exteris Key Points

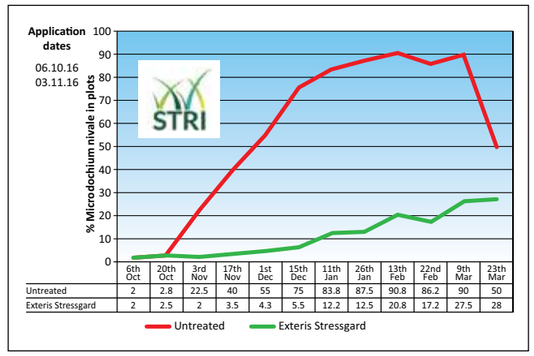
MAPP 17825. Exteris® Stressgard contains 12.5g/L Fluopyram and 12.5g/L Trifloxystrobin.

- Preventative disease control
- Diseases treated include: Microdochium Patch and Dollar Spot
- New SDHI chemistry
- Contains Stressgard formulation technology
- Low A.I. loading
- Pack size 5L – treats 5,000 m²

Exteris Stressgard is a new systemic, foliar fungicide formulated to manage Microdochium Patch and Dollar Spot. The product contains a completely new active ingredient, Fluopyram, from a new chemical group of fungicides known as SDHI's, in combination with Trifloxystrobin and Bayer's Stressgard Formulation Technology. Fluopyram is an acropetal penetrant that is able to enter the grass plant via roots, shoots or leaves, moving upward within the plant to provide protective activity.

Where to use Exteris Stressgard

Exteris Stressgard is approved for use on golf greens, tees and fairways, bowling greens, cricket pitches, lawn tennis courts and professional sportsgrounds/stadiums.



	6th Oct	20th Oct	3rd Nov	17th Nov	1st Dec	15th Dec	11th Jan	26th Jan	13th Feb	22nd Feb	9th Mar	23th Mar
Untreated	2	2.8	22.5	40	55	75	83.8	87.5	90.8	86.2	90	50
Exteris Stressgard	2	2.5	2	3.5	4.3	5.5	12.2	12.5	20.8	17.2	27.5	28

When to use

For best results Exteris Stressgard should be used preventatively before or at the first occurrence of symptoms, usually early autumn when weather conditions are conducive to disease development. A second application can be made if necessary, at or before 28 days (minimum 14 day interval).

Turf diseases controlled

Exteris Stressgard is approved to treat Microdochium Patch (*Microdochium nivale*) and Dollar Spot (*Sclerotinia homeocarpa*).

Stressgard Formulation Technology

Stressgard Formulation Technology is a unique combination of active ingredients, inert ingredients and turf specific co-formulants. It is the combination of these which help the product perform so well in unique turf disease stress conditions. Stressgard Formulation Technology is specifically designed for turf and has been fine tuned to upgrade the performance of the product, providing superior disease management.

Resistance Management

The use of Exteris Stressgard should conform to resistance management strategies, such as rotation with products containing active ingredients with different modes of action, or limiting the total number of applications per season and using non-chemical methods of disease control. Bayer recommends responsible product stewardship to ensure effective long term control of the fungal diseases on the label.

How to use

Sprayers should be THOROUGHLY CLEANED before use and filters and jets checked for damage and blockages.

Add the required quantity of Exteris Stressgard to a half filled spray tank with the agitation system in operation and fill to the required level. Spray immediately after mixing. Continue agitation at all times during spraying and stoppages, until the tank is completely empty.

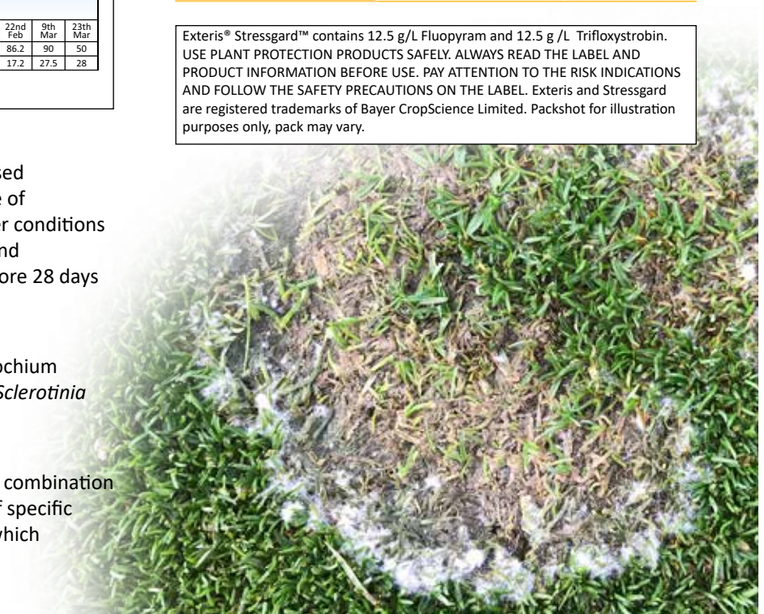
If grass is being mown, Exteris Stressgard should be applied after cutting and further mowing should not take place until at least 48 hours after treatment. This will allow adequate movement of the product throughout the plant. Allow a minimum of 14 days between applications of Exteris Stressgard.

Maximum number of treatments is 2 per year.

Exteris Stressgard should not be used on commercial, residential or estate lawns.

	Vehicle mounted hydraulic sprayer	Knapsack sprayer
Amount of Exteris Stressgard	10L/Ha	100ml/100m²
Amount of water	200 to 600L/Ha	2 to 6L/100m²

Exteris® Stressgard™ contains 12.5 g/L Fluopyram and 12.5 g /L Trifloxystrobin. USE PLANT PROTECTION PRODUCTS SAFELY. ALWAYS READ THE LABEL AND PRODUCT INFORMATION BEFORE USE. PAY ATTENTION TO THE RISK INDICATIONS AND FOLLOW THE SAFETY PRECAUTIONS ON THE LABEL. Exteris and Stressgard are registered trademarks of Bayer CropScience Limited. Packshot for illustration purposes only, pack may vary.



Cabadex® - Selective herbicide

SAFE AND EFFICIENT CONTROL OF DIFFICULT TO KILL WEEDS IN BOTH ESTABLISHED AND YOUNG TURF

Cabadex® Key Points

MAPP No. 13948. Cabadex contains 144g/L fluroxypyr and 2.5g/L florasulam.

- Unique formulation containing florasulam and fluroxypyr
- Can be used on newly sown turf (from two leaf stage)
- Controls difficult weeds such as yarrow and lesser trefoil (yellow suckling clover)
- Low dose rate for cost-effective weed control
- Foliar and root uptake provides efficient control of difficult weeds
- Pack Size: 5L

Weeds controlled

- Slender speedwell
- Common daisy
- Common dandelion
- Common mouse-ear
- Creeping buttercup
- White clover
- Ribwort plantain*
- Bird's-foot trefoil*
- Yarrow*

* Moderate control only

Trials and commercial use have also shown good control of yellow suckling clover and pearlwort.

	Cabadex®	
	per ha	per 100m²
Application rate	2L	20ml
Water volume	200L	2L

Cabadex is effective against a wide range of weeds including difficult to control species such as Yarrow and Daisy.

Control is achieved using very low rates of active ingredients, making Cabadex the obvious choice for efficient and environmentally sensitive weed management in the UK.

Mode of action

Cabadex combines two active ingredients with different modes of action.

Fluroxypyr is an auxinic herbicide that enters plants via the leaves and disrupts normal growth functions.

Florasulam however, can enter via the roots as well as the foliage, helping to ensure complete distribution throughout the plant.

Application equipment

Cabadex can be applied through tractor-mounted hydraulic sprayers or knapsack sprayers as a MEDIUM spray, as defined by the BCPC system.

Use herbicides safely. Always read the label and product information before use. Please refer to the product label or our website for further technical information.

Cabadex is a registered trademark of Dow Chemical Company ("Dow") or an affiliated company of Dow.

Areas of use

Cabadex can be used on areas of managed amenity turf or amenity grassland.

This includes golf courses, winter sports pitches, racecourses and professional lawn care as well as airfields, roadside verges and embankments.

Safe on young turf

The product can be used on newly sown turf from the two leaf stage for spring or summer sowings. A good covering of grass should be present before application.

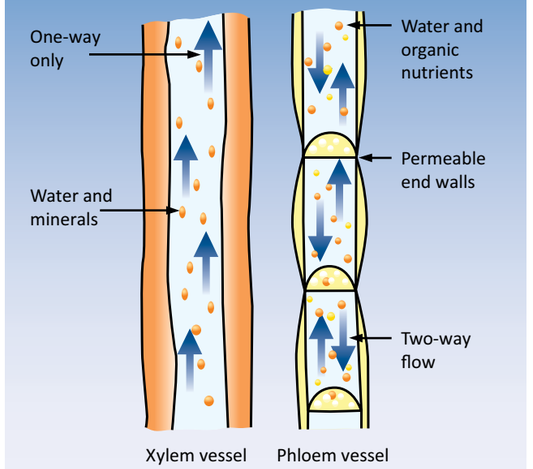
Application notes

Apply when weeds are actively growing (normally between March and October). Do not apply in periods of drought unless irrigation is applied.

Re-seeding can take place as little as 4 weeks after application. Clippings from grass treated with Cabadex can be safely used for mulch after the third cut.

Use of Cabadex is not subject to LERAP restrictions. Where Broad-leaved Plantain is present in addition to other target weeds, apply a tank-mix of Cabadex at 2L/ha + 2,4-D amine (Depitox) at 2L/ha.

Fluroxypyr and florasulam move through the plant in both the xylem and phloem vessels. This provides effective distribution and accumulation at the growing points in both shoots and roots.



Common Daisy

Yellow Suckling Clover

Columbus® - Turf herbicide

TRIPLE ACTIVE SELECTIVE HERBICIDE FOR USE TURF AND PROFESSIONAL LAWNCARE

Columbus® Key Points

MAPP No. 18462 contains 20g/l clopyralid, 40g/L fluroxypyr and 200g/L MCPA.

- Powerful 3 way selective herbicide
- Controls a wide range of weeds
- Unique micro-emulsion formulation enhances herbicide activity
- Use on golf fairways, tees, sports pitches and other amenity grass
- 5 litre pack treats 12,500m^2
- Can re-seed after 8 weeks

Control spectrum

- Creeping buttercup
- Yellow suckling clover
- Common daisy
- White clover
- Broad- leaved plantain
- Common dandelion
- Ribwort plantain
- Common mouse-ear
- Knotgrass

Other weeds known to be controlled by Columbus*

- Mayweed
- Shepherd's purse
- Toad rush
- Curled dock
- Common chickweed
- Creeping thistle
- Spear thistle
- Field wood rush
- Seal heal
- Common sorrel
- Broad leaved dock
- Yarrow

*Control from commercial experience – use on these weeds is at users own risk.

	Columbus®	
	per ha	per 100m^2
Application rate	4L	40ml
Water volume	200 to 1,000L	10L

Best use advice

- Best control of target weeds will be achieved when conditions are favourable for growth, usually April to September when soils are moist and temperatures are warm.
- Excellent turfgrass safety including: annual meadow grass, browntop bent, chewings fescue, creeping bent, perennial ryegrass, slender and creeping red fescue, smooth-stalked meadow grass and strong creeping red fescue.
- Don't apply to newly sown grass or established grass which is under stress. This may include: frost damage, drought, waterlogging, nutrient deficiency, disease and pest attack.
- Can be applied to young turf that has been sown for at least two months.
- If low drift nozzles are being used, the water volume must be kept at or above 400 litres per hectare.
- Avoid mowing 3 days before and after application to ensure sufficient weed leaf surface is present to allow uptake and translocation of **COLUMBUS®**.
- Do not drill grasses into sward within 6 weeks of spraying.
- Do use any plant material treated with **COLUMBUS®** for composting or mulching.
- Rain fast in 2 hours. Refer to Headland Weathercheck for best results.
- The product label carries a LERAP B requirement please see label for full details.

Quickfire® - Turf herbicide

BROAD SPECTRUM, ECONOMICAL SELECTIVE HERBICIDE, FOR USE IN TURF AND PROFESSIONAL LAWNCARE

Quickfire® Key Points

MAPP No. 17245 contains 150g/l Mecoprop-p and 18.7g/l Dicamba.

- Cost-effective 2 way selective herbicide
- Controls a wide range of turf weeds
- Use on golf fairways, tees, sports pitches, lawns and other amenity grass
- 5 litre pack treats 1 hectare (10,000m^2)
- 2 applications per year
- Pack Size: 5L

Control spectrum

- Broad- leaved plantain
- Daisy
- White clover
- Common mouse-ear
- Ribwort plantain
- Bird's foot trefoil
- Spear thistle
- Chickweed

	Quickfire®	
	per ha	per 100m^2
Application rate	5L	50ml
Water volume	200 to 500L	2 to 5L

Quickfire is a new herbicide effective against a wide range of weeds including Daisy, White Clover, Spear Thistle and Plantains. Quickfire contains two tried and tested active ingredients (Mecoprop-P and Dicamba) to ensure broad spectrum weed control. Unlike a number of products, Quickfire can be used through knapsack and boom mounted sprayers and users can apply two applications per year.

Application equipment

Quickfire can be applied through boom mounted equipment or knapsack sprayers as a MEDIUM spray, defined by the BCPC system.

Areas of use

Quickfire can be used on all managed amenity turf areas include: golf course fairways and tees, sports pitches, lawns and other amenity turf.

Use herbicides safely. Always read the label and product information before use. Please refer to the product label or our website for further technical information.

Blaster® Pro - Turf herbicide

FOLIAR APPLIED HERBICIDE FOR THE CONTROL OF PERENNIAL BROAD- LEAVED WEEDS INCLUDING: NETTLE, DOCK, BRAMBLE, BROOM AND GORSE.

Blaster® Pro Key Points

MAPP No. 15752. Blaster Pro contains 240g/L Triclopyr and 60g/L Clopyralid.

- The ideal solution for difficult weeds such as nettles, docks and thistles
- Can be used on all established amenity grassland
- Controls woody weeds
- Simple single rate of application
- Pack Size: 1L

Where to use Blaster® Pro

Blaster Pro can be used on amenity grassland such as golf course roughs, banks, roadside verges, cemeteries and industrial areas.

Weed	Optimum timing of application
Common nettle	Spray when actively growing but preferably before flowering (normally up to mid-June).
Dock (curled & broad-leaved)	Treat in the spring when docks are in the rosette stage up to 25cm high. If the grass has been cut leave for 2 to 3 weeks to allow sufficient re-growth to occur before spraying. On large well established docks, or where there is a high resevoir of seed in the soil, a second dose the following year may be required.
Creeping thistle	Spray when actively growing but before flowering spikes are 15cm high. Applications of Blaster Pro during flowering or seeding is likely to lead to reduced levels of control. If grass has been cut, treat 2 to 3 weeks after cutting when sufficient re-growth has occurred.
Bramble, broom & gorse	Spray in June to August when actively growing but before plants begin to senesce in the autumn. It is essential that all the foliage is thoroughly wetted or incomplete kill may result.

	Blaster® Pro
Application rate	60ml in 10L water

Notes for guidance

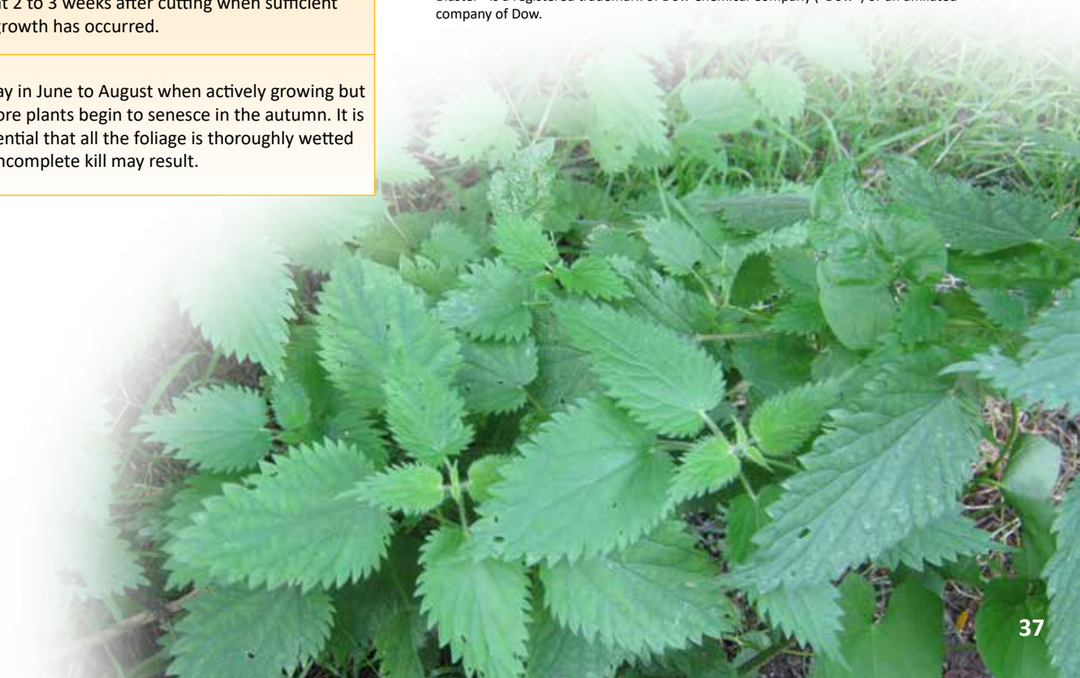
Only use Blaster Pro on amenity grassland that has been established for at least one year. Do not apply the product as an overall spray where clover is an important part of the sward.

DO NOT spray in drought, or very hot or cold conditions.

Occasionally, some yellowing of the sward may be seen following treatment. This is however quickly outgrown.

Avoid damage and drift on to susceptible crops or waterways. All conifers, especially Pine and Larch are very sensitive to spray drift.

Additional weed species that are controlled by Blaster Pro can be found by scanning QR Code or visit http://tinyurl.com/blasterds



New-Way Weedspray - Non-selective herbicide

NON-SELECTIVE HERBICIDE FOR AMENITY AND INDUSTRIAL WEED AND MOSS CONTROL ON HARD SURFACES AND OTHER AMENITY AREAS

New-Way Weedspray Key Points

MAPP No. 15319. New-Way Weedspray contains 240g/L acetic acid.

- Contains acetic acid. One of only two foliar acting herbicides approved on hard surfaces
- Approved for moss control on hard surfaces
- Fast acting - weeds die 1 to 2 days after treatment
- Ideal as a rotation partner with glyphosate to avoid potential weed resistance on hard surfaces

- Formulated from naturally occurring ingredients
- Pack Size: 10L

New-Way Weedspray is a non-selective herbicide based on naturally occurring ingredients. The active ingredient – acetic acid has been formulated from the highest food-grade product and developed with a naturally occurring protein ingredient which literally doubles the herbicidal properties of acetic acid compared to standard products.

What it is it?

New-Way Weedspray contains 240g/litre acetic acid formulated with a naturally occurring activator – NWS Booster. Acetic acid occurs naturally through the fermentation process and breaks down to water in the ground.

How does it work?

New-Way Weedspray is a fast-acting, non-selective herbicide which is active against most soft tissue it comes into contact with. It controls grasses, broad-leaved weeds and mosses. The product produces discolouration and browning of the foliage within a few hours of treatment. Perennial weeds generally require more than one application for control but annual weeds are usually controlled with one treatment.

Areas of use

New-Way Weedspray can be used to control weed growth in amenity situations such as footpaths and pavements, parks, around trees, shrubs and hedges and in industrial areas such as railways, industrial sites and fence lines etc. It is also approved for moss control on hard surfaces. Unlike other moss killers for hard surfaces, New-Way Weedspray will also control weeds and grass as well, eliminating the need for a separate application.

Application

Apply the spray so that leaves and stems are fully wetted before run-off. As the product works by contact action it is important that the weed is fully covered otherwise there will be partial control. The product is not translocated within the plant and therefore is safer to use around trees, shrubs and other valuable plants.

Mixing

Mix 1 part New-Way Weedspray to 3 parts of clean water. For example in a 16 litre knapsack sprayer mix 4 litres of New-Way Weedspray to 12 litres of water in the following manner. Half fill spray tank with clean water. Add the required amount of New-Way Weedspray. Fill the tank with more clean water to the required level. Agitate before use.

Weather

Applications made in the cooler months will take longer to work. In warm, sunny weather, most weeds will die within 1 to 2 days. Apply the product on a dry day. Rain, soon after spraying, may wash spray off foliage leading to poor results.

Subsequent planting

As there are no residual effects with the product in the soil, sowing and planting may be undertaken as soon as the weeds have died.

Moss control on artificial sports surfaces

As well as moss control on paths and other hard areas, New-Way Weedspray can be used to control moss on artificial sports surfaces. As there are a wide variety of materials employed for this use, always test on a small area to confirm the suitability of New-Way Weedspray before applying to the entire playing surface.

Use plant protection products safely. Always read the label and product information before use. Please refer to the product label or our website for further technical information.

Weed control information

HOW TO USE HEADLAND HERBICIDE TECHNOLOGY FOR EFFECTIVE WEED CONTROL

A 'weed' is commonly explained as a 'plant out of place'. Their presence in amenity situations is often detrimental in a number of ways.

Selective herbicides can eliminate broad-leaved weeds in turfgrass without damaging the grass itself. They need to be controlled as;

- They can ruin the aesthetic appearance of carefully manicured turf areas.
- Weeds affect wear tolerance and often result in sparse, muddy surfaces.
- Weed presence can greatly impact on the playing surface by affecting ball roll characteristics
- Broad-leaved weeds compete with desirable grasses for nutrients, water and light and can affect the health and vigour of the sward.
- They produce huge quantities of seed that can spread weed into previously clean areas.

Total herbicides are non-selective and used where all vegetation is to be removed. Often used on hard surfaces, amenity areas, highways and industrial sites, total herbicides will control grasses, broad-leaved weeds and some will control moss as well, e.g. New-Way Weedspray.

Getting the best out of Headland herbicides

1. Read the product label carefully taking into account any statutory requirements. Take note of timing issues. Most weeds are best controlled when they are young and actively growing.
2. Conversely most weeds are poorly controlled in periods of cold or drought where lack of growth will result in poor weed control.
3. Take note of water spray volumes. There are often regulatory reasons not to spray below the minimum water volume per area. Poor weed control may occur at low water volumes because of inadequate spray coverage of the target weeds.
4. Spraying at higher water volumes will help where weeds are large. However, ensure that run-off does not occur as this may result in poor control.
5. Regular calibration of your sprayer is important to ensure correct application rates.

Guide to the use of Headland herbicides for specific weed types and situations

Columbus® (see page 35)


White clover


Dandelion


Plantain


Creeping buttercup

Cabadex® (see page 36)


Yellow suckling clover


Slender speedwell


Daisy


Pearlwort* in fine turf

Blaster® Pro (see page 37)


Nettles


Nettle (close-up)


Thistle


Dock

New-Way Weedspray (see page 38)

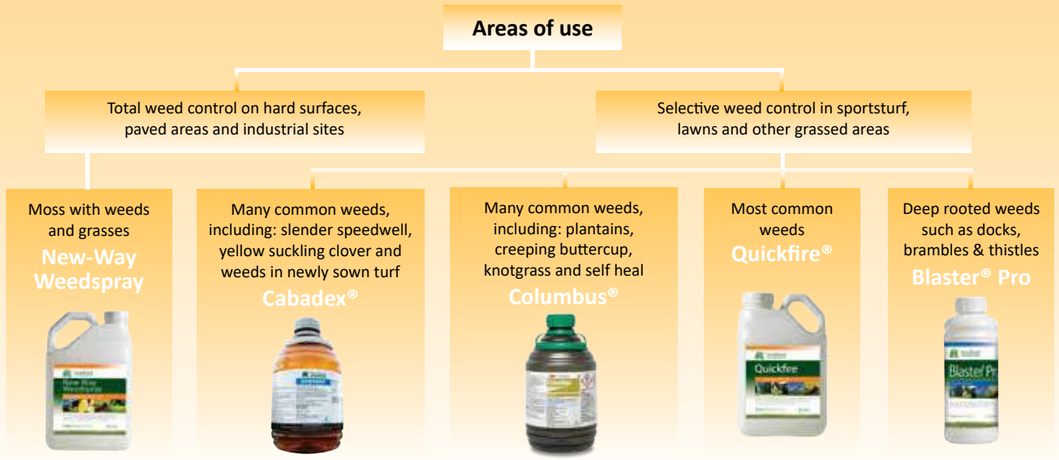

Moss on hard surfaces


Weeds in paving


Weeds in pavers

Herbicide Selection Chart

Use this simple to follow chart to make the correct herbicide selection, ensuring safe and effective weed control.



Clipless NT® - Plant growth regulator

A TRINEXAPAC - ETHYL PLANT GROWTH REGULATOR FOR THE MANAGEMENT OF GRASS GROWTH IN AMENITY GRASSLAND AND MANAGED AMENITY TURF

Clipless NT® Key Points

MAPP No. 17558. Clipless NT contains 120g/L of trinexapac - ethyl.

- Reduces turf height and improves sward density
- Cuts down on mowing frequency
- Can be used on all turf areas
- Trials show equal activity to other trinexapac - ethyl formulations
- Excellent tank-mix partner with
  - XTEND 46-0-0 + Elevate Fe or Headland Soluble Iron on outfield turf
  - Protec Plus 28-0-0 + Seamac Proturf Fe on fine turf
- Pack Size: 5L

Clipless NT is a new plant growth regulator for use on all areas of amenity grassland and managed amenity turf. Clipless NT works by blocking the production of gibberellic acid within the plant leaf, stopping cell elongation and upward growth. This results in a more compact growth habit. Energy is diverted away from vertical growth towards lateral growth and root development, providing a closer, denser sward. The turf requires less mowing, with potential savings of manpower and cutting machinery costs. Clipless NT is a useful tool to help reduce mowing frequency in difficult or dangerous areas such as steep banks etc.

Application timing

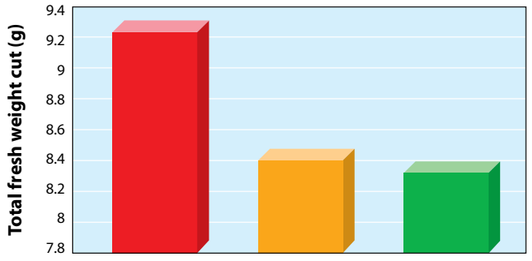
Clipless NT applications can commence at any stage of the growing season. Apply as soon as proper spring growth has started, typically mid-April on outfield or coarse turf and mid-late May on fine turf. Continue with applications until end of August to early September. (See product label for maximum number of applications allowed per year).

Advanced Formulation Technology

Much has been made of the formulation technology of competitor PGR products, both in terms of efficacy and rainfastness. In order to meet registration requirements, Clipless NT PGR has had to prove its performance as being equal or better than the industry standard product.

To demonstrate its rainfastness, Clipless NT was trialled against a competitor product, using 10mm of simulated rainfall 4 hours after application and the effect on grass growth monitored both in terms of total fresh weight of grass produced and grass length.

Clipless NT demonstrated equal or superior performance in terms of rainfastness and subsequent growth regulation.



Note - the lower the fresh weight, the more effective the growth regulation after rainfall.

For full detals of the trial scan the QR code or visit http://tinyurl.com/clipless-rainfast

Amenity Chemicals

Clipless NT® - Plant growth regulator

A TRINEXAPAC - ETHYL PLANT GROWTH REGULATOR FOR THE MANAGEMENT OF GRASS GROWTH IN AMENITY GRASSLAND AND MANAGED AMENITY TURF

	Clipless NT®					
Areas of use	Greens	Greens	Tees	Fairways	Rough and semi rough	Amenity grassland, grass banks, roadside verges
Frequency of application	Monthly	Every 2 weeks	Monthly	Monthly	Monthly	Up to a maximum of 5 applications per year
Application rate	0.4L/ha	0.2L/ha	0.75L to 1.5L/ha*	0.75L to 1.5L/ha*	1.6L to 2.4L/ha	Up to 3.2L/ha
Water volume	200 to 400L/ha	200 to 400L/ha	200 to 400L/ha	200 to 400L/ha	200 to 400L/ha	Minimum of 400L/ha
Rate of Clipless NT per 100m² (knapsack)	4ml	2ml	7.5 to 15ml	7.5 to 15ml	16 to 24ml	Up to 32ml
Water volume per 100m² (knapsack)	2 to 4L	2 to 4L	2 to 4L	2 to 4L	2 to 4L	4L

Note: *Use higher rate where Perennial ryegrass is the dominant grass species.
A maximum single dose rate of 3.2 litres/ha can be applied with a total maximum of 16 L/ha of Clipless NT allowed in any one year.

Product usage suggestions - tees and fairways

Tees and fairways are often overlooked when it comes to PGR applications, but in reality they are one of the best areas to use Clipless NT in combination with XTEND Soluble 46-0-0 and Elevate Fe. The combination of rapid solubility and slow release nitrogen in XTEND Soluble 46-0-0 makes it an ideal tank-mix partner to Clipless NT PGR. For a rapid-green up with no wheel marks, risk of scorch or time-consuming pre-mixing , Elevate Fe complexed liquid iron completes the trio of tank-mix components.

More colour for longer with less cutting

Field trials conducted in 2012/13 showed that areas treated with XTEND Soluble 46-0-0, Elevate Fe and Clipless NT PGR retained more of the applied nitrogen and iron for longer, compared to areas treated without Clipless NT PGR. The reduced rate of nutrient loss by clipping removal is a likely explanation.

Suggested tank-mixes for Clipless NT®

Pre-Event green up with Clipless NT®
Tees, Fairways, Semi-Rough

Pre-tournament green up or spring / summer feed without excessive clippings generation. Applications from mid-April.

1. XTEND® Soluble 46-0-0 — 20 to 40kg/ha
+ 2. Elevate Fe® — 20 to 40L/ha
+ 3. Headland Clipless NT® — 750 to 1,500ml/ha
in 300 to 400L/ha Spray Volume

Summer feed with PGR
Greens

Summer fertilisation to provide consistent growth without flushes. Applications from end May to end August.

1. Solufeed® NK 15-0-25 — 10 to 20kg/ha
+ 2. Solufeed® TeMag™ Elite — 6kg/ha
+ 3. Protec® Plus 28-0-0 — 20 to 40L/ha
+ 4. Headland Clipless NT® — 200 to 400ml/ha
in 400L/ha Spray Volume

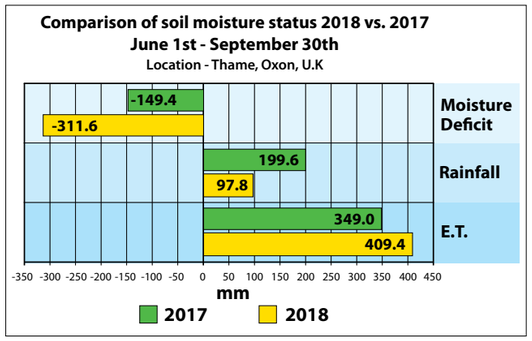
Use plant protection products safely. Always read the label and product information before use. Please refer to the product label or our website for further technical information.

Soil Surfactants

A recovery plan for drought-damaged outfield areas

TriCure AD INFORMATION

Summer 2018 was one of our most testing yet with record high temperatures, minimal rainfall and consistently high, daily E.T levels.



Data from our Thame location showed a net moisture deficit of nearly 312mm (12.5”) from the beginning of June to the end of September. (Net moisture deficit = rainfall - Evapotranspiration E.T) That figure was double the same period in 2017 and meant loss of fairway grass cover was a common feature going into the autumn of 2018.

One of the most severe consequences of the extreme weather in Summer 2018 was the level of dry-down that had taken place both in the upper organic matter layer but also below that in the rootzone from 10-12 weeks of record heat and E.T. The hydrophobic nature of the surface organic matter layer led to indifferent results in the autumn when it came to overseeding, with many areas going into the winter extremely thin. Coming into spring 2019, a lot of outfield areas will require renovation work including overseeding, core aeration and the like to promote increased sward density before the summer of 2019.

> “One of the most severe consequences of the extreme weather in Summer 2018 was the level of dry-down that had taken place...”

Recovery program using TriCure AD™

In early spring before renovations have been undertaken it is essential to ensure that the organic matter is fully re-wetted. This is particularly important when you take into account the fact that the areas most likely to have suffered during the summer of 2018 and have shown poor recovery potential since, were those highest in organic matter.

The high activity rating of TriCure AD ensures that low rate applications made between 2.5L - 5.0L/ha will facilitate fast rewetting of the surface organic matter layer and ensure that moisture from rainfall or irrigation will penetrate down to the soil below instead of being lost from the surface.

Tank-mix flexibility

With variable grass cover and a low level of sunlight this winter so far, a lot of outfield areas have high moss levels coming into the new year. The tank-mix flexibility of TriCure AD allows the product to be mixed with either Soluble iron or Elevate Fe and a slow release liquid feed like Xtend Soluble 46-0-0 therein providing soil surfactant, iron and plant nutrition in one time saving application.

1 Xtend® Soluble 46-0-0 20-40 kg/ha + 2 Elevate Fe® 20L/ha + 3 TriCure AD™ 2.5-5.0 L/ha in 300-400 L/ha spray volume

TriCure AD™ Key Points

- Prevents and cures hydrophobic conditions and Dry-Patch
- Treats all rootzone particles including peat and thatch
- Shows improved soil surface dry-down characteristics
- Reduces irrigation needed to maintain healthy turf
- Is safe to apply - no need for additional irrigation to prevent scorch
- Liquid formulation in 10 or 100 litre containers
- Multi-rate flexibility allows rates to be reduced down to 7L/ha on fine turf in the spring and increased in line with temperature and evapotranspiration in the summer

The 'Tri' in TriCure

TriCure contains three different surfactant chemistries that treat all types of rootzone particles, such as soil and sand, as well as organic matter, including peat and thatch.

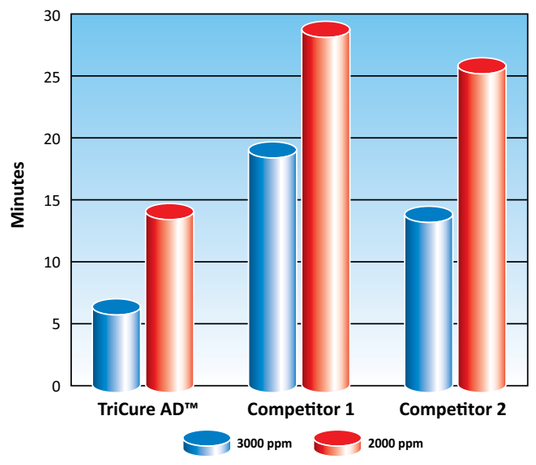
This multi-molecular approach provides 3 distinct characteristics, and advantages over single molecule wetters.

1. Adhesion to various surfaces including plant lignin and cellulose, attracting water molecules and facilitating water penetration into thatch and soil organic matter.
2. Better hydration of soil particles along with a reduction in water surface tension.
3. Rapid spreading and downward penetration using non-phytotoxic chemistry.

Mutli-rate fexibility with safety

TriCure AD is more active, rate for rate, than competitor surfactants due to its multi-molecular chemistry. Competitor products have to be applied at much higher rates to achieve equivalent results. Many contain only one surfactant technology and only work well in one given situation. The graph (above right) shows the effect of reducing the application rate by a third on the efficacy of TriCure AD. This shows less reduction in efficacy compared to two well-known competitors. On fine turf, TriCure AD can be effective down to 7 litres per hectare, used early in the spring with application rates increased, as temperatures rise in the summer, up to a maximum rate of 20 litres per hectare.

Water Drop Penetration Test - Hydrophobic Soil



TriCure AD will not scorch the grass plant because it does not contain any of the commonly used additional ingredients that are associated with burning or phytotoxicity. TriCure AD can be applied in the morning and safely watered-in in the evening without risk of burning.

TriCure AD™ application

Commence applications in March to ensure that soil moisture conditions are optimised before any likelihood of spring drought stress (see page 41). Apply to a dry rootzone and wash product off the leaf to maximise efficiency, though there is no risk of scorch. Apply monthly according to temperature and stress levels on the plant with the final, lower rate application in September. TriCure AD is broken down naturally in the soil by microbial activity and therefore no residual activity will persist into the winter.

	TriCure AD™	TriCure AD™ - Fine Turf				
Application usage	**Coarse turf areas only**	**Early Season**	**Temperatures <20°C**	**Temperatures >20°C**	**Temperatures >25°C**	**Curative Severe Dry Patch**
Application rate	2.5L/ha	7L/ha	10L/ha	14L/ha	20L/ha	20L/ha
Water volume	300 to 400L/ha	600 to 800L/ha	600 to 800L/ha	600 to 800L/ha	600 to 800L/ha	600 to 800L/ha
Supplementary irrigation	Recommended	Wash product off leaf before next cut				
Pack size	10L & 100L	10L & 100L	10L & 100L	10L & 100L	10L & 100L	10L & 100L

TriCure AD™ is classified, labelled and supplied in accordance with the CLP European regulation No. 1272/2008 and REACH European Regulation No 1907/2006.

TriCure AD™ application on tees, fairways and outfield turf

Trials conducted since 2010 have shown that the multi-rate flexibility of TriCure AD can extend its usage into other outfield areas. Applications on tees, fairways and sports turf have shown excellent results using application rates as low as 2.5 litres per hectare.

This is only possible due to the highly active TriCure AD formulation working effectively at reduced rates where visible benefits can still be shown on outfield turf. At the 2.5L per hectare application rate, TriCure AD is cost-effective compared to straight penetrant technologies, but in practice it is much more effective. Rather than just reducing water tension to facilitate moisture movement through the profile, TriCure AD also combats surface hydrophobicity and allows more efficient moisture penetration and distribution through the profile, with less risk of run-off.

Tank-mixing of TriCure AD™

Making applications to tees, fairways and sports turf is time consuming so predictably turf managers are looking for ways to save time by tank-mixing products. One potential issue is placement compatibility, where some of the tank-mix components are destined for the soil and some for the leaf.

Trials and subsequent end-user feedback has shown that TriCure AD can successfully and safely be applied with Xtend Soluble 46-0-0, Elevate Fe and Clipless NT plant growth regulator.

To gain the maximum benefit and avoid placement compatibility issues, the tank-mix should be applied in the morning, left on the leaf for a minimum of 6 hours to allow foliar absorption of the Xtend Soluble, Elevate Fe and Clipless NT and then watered in either using overhead irrigation or by rainfall to move the TriCure AD into the soil.

Trial plots showing the effect of TriCure AD tank-mixed with XTEND Soluble 46-0-0 and Elevate Fe.

A typical tank-mix would be:

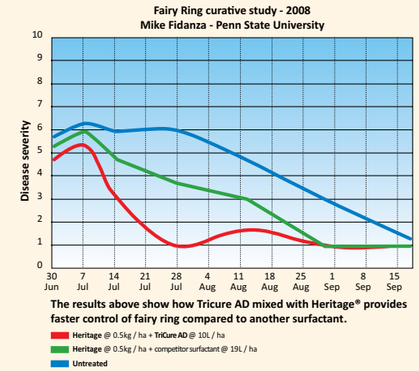
1. XTEND® Soluble 46-0-0 **20-40kg/ha**
+
2. Elevate Fe® **20L/ha**
+
3. Clipless NT® **0.75-1.5 L/ha**
+
4. TriCure AD™ **2.5L/ha**

in **300-400 L/ha spray volume**

Why TriCure AD™ is the best surfactant tank-mix partner for fairy ring control

TriCure AD contains three separate soil surfactant technologies within one formulation to counteract hydrophobicity on sand, soil and organic matter.

This is important because superficial fairy ring tends to be active in the surface thatch layer and so having a surfactant technology that counteracts hydrophobicity in organic matter is essential. Type I and II fairy rings tend to be active deeper down the soil profile and this may be sand, soil dominated, or in fact like most golf greens, a mixture of sand, soil and organic matter. In this scenario, TriCure AD's three surfactant technologies give unrivalled control when applied in combination with an approved fairy ring fungicide like Heritage® (see graph right).



Fairy ring type	Rate of Heritage®	Rate of TriCure AD™	Application notes
Superficial fairy ring	**0.5kg / ha**	**10L / ha**	Apply in 600 litres of water and irrigate to remove from the leaf surface.
Type I and Type II Top 5cm of rootzone	**0.5kg / ha**	**10L / ha**	Apply in 600 litres of water and irrigate with sufficient water to wash into the soil profile.
Type I and Type II Deeper than top 5cm of rootzone	**0.5kg / ha**	**20L / ha**	Aerate the affected area first, to the depth of the active mycelium. Apply in 600 litres of water and irrigate with sufficient water to wash deep into the soil profile.

TriCure AD™ Pellets

TriCure AD™ INFORMATION

ACCURATE DOSING THROUGH HOSE END APPLICATORS

TriCure AD™ Pellets Key Points

- 75% active ingredient – TriCure AD
- Apply curative level of TriCure AD to drought-stressed turf
- Cost effective and easy to apply
- Non phytotoxic

TriCure AD Pellets are a fast, safe and convenient method of applying TriCure wetter through hose-end applicators (available from Headland). The pellets are designed to dissolve quickly in order to provide an accurate dose sufficient to effectively treat and prevent hydrophobic soils.

Each pellet consists of 75% TriCure AD and can be used as either a stand alone treatment or as a supplement to regular water management programmes.

Many alternative pellets take a long time to dissolve - resulting in low rates of wetter being actually applied.

TriCure AD and TriCure AD Pellets are non-phytotoxic and will not burn or discolour turf.

Application

The rate at which TriCure AD Pellets dissolve is determined by (1) water pressure (2) flow rate and (3) water temperature.

To ensure correct dosage, carry out a calibration by recording the time taken for one pellet to fully dissolve.

Use the table below to determine the correct dosage per 100m^2.

Pellet application rate

Use	Application times per 100m^2	
Time taken for 1 pellet to dissolve fully	To give FULL RATE application* (10 litres/ha) APPLY FOR	To give LOW RATE application* (5 litres/ha) APPLY FOR
6 minutes	3 minutes 20 seconds	1 minutes 40 seconds
8 minutes	4 minutes 27 seconds	2 minutes 13 seconds
10 minutes	5 minutes 33 seconds	2 minutes 47 seconds

Full rate (10 L/ha) will provide activity for up to 4 weeks.
Low rate (5 L/ha) will provide activity for around 2 weeks.
Please note: Longevity of activity is dependent on soil type and climatic conditions.
*Supplement with further irrigation to ensure optimum penetration throughout the rootzone.

Uniform water distribution with TriCure AD

Non-uniform water distribution (competitor)

TriCure AD™ Granular

EASY APPLICATION IN HARD TO ACCESS AREAS

TriCure AD™ Granular Key Points

- Easy to apply through a drop or rotary spreader
- Ideal for areas that are difficult to spray such as bunker banks, tees and contoured areas of greens
- Low application rate
- DG-Lite granule technology ensures fast solubilisation with no pick-up

TriCure AD Granular is easy to spread on bunker edges, slopes, or anywhere with difficult access for a spray rig. Containing the same active ingredient as in liquid TriCure AD, use of the granular product is an effective alternative to spraying.

TriCure AD Granular utilises DG-Lite, dispersible granule technology as a carrier to quickly release the chemistry with no residue left after normal irrigation.

Like Tricure AD, TriCure AD Granular does not contain any of the commonly used additional ingredients that are associated with burning or phytotoxicity. It can be applied in the morning and safely watered-in in the evening without risk of burning.

	TriCure AD™ Granular	
Application usage	Curative	3 monthly rate
Application rate	12g/m^2	24g/m^2
Supplementary irrigation	Wash product off leaf before next cut	
Pack size	18kg	18kg
Bag coverage (Per hectare)	1 pack treats 1,500m^2	1 pack treats 750m^2

TriCure AD™ is classified, labelled and supplied in accordance with the CLP European regulation No. 1272/2008 and REACH European Regulation No 1907/2006.

Terafirm™ - Advanced soil penetrant

FOR USE IN ALL FINE AND COARSE TURF SITUATIONS INCLUDING GOLF AND BOWLING GREENS, TEES, FAIRWAYS AND SPORTS PITCHES

Terafirm™ Key Points

- Non-phytotoxic soil penetrant
- Accelerates downward water movement
- Helps maintain drier soil surface conditions
- Reduces puddling and anaerobic conditions

Terafirm soil penetrant is formulated to improve the downward movement of water through the soil, helping to achieve a firmer playing surface.

Taking its name from the Latin *terra firma*, meaning “solid” or “firm earth”, Terafirm works by reducing the surface tension of water, minimising lateral water movement and facilitating drainage. Terafirm also acts to speed surface drying and open up pore space within the soil during dry down by accelerating natural soil contraction.

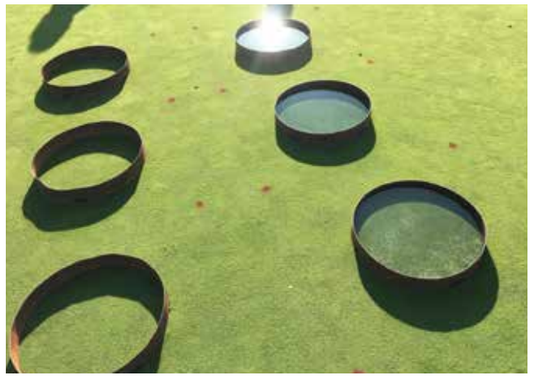
Terafirm’s unique, non-phytotoxic formulation will help bring soils to optimal field moisture capacity, enabling the water to move downwards through the soil profile, as quickly as the soil’s physical properties will allow, therefore:

- **Accelerating surface dry-down**
- **Reducing anaerobic conditions**
- **Reducing puddling**
- **Producing a faster-draining, drier and healthier turf**

Compatible for use with most conventional sprayers, applications of Terafirm can be made on a monthly or more frequent basis, most-effectively before the onset of seasonal periods of heavy moisture. As a spot treatment on wet areas, Terafirm can be applied at two-week intervals until the excessive moisture conditions subside.

	Terafirm™
Application Rate	6.5-13 litres/ha in 300 - 600 litres water
Interval	Monthly

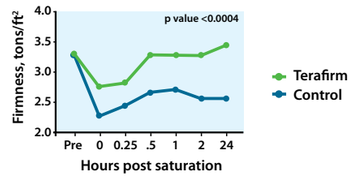
Terafirm is classified, labelled and supplied in accordance with the CLP European regulation No. 1272/2008 and REACH European Regulation No 1907/2006.

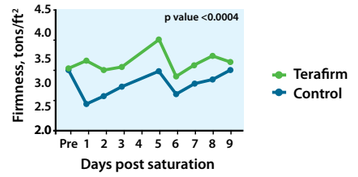


Independent research data supports the benefits of applying Terafirm™

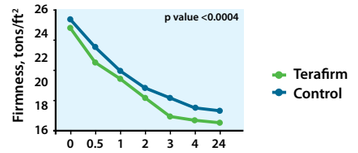
Trials conducted in 2018 at Rutgers University assessed the performance of Terafirm applied at 13L/ha to a rootzone prior to a simulated saturation event. Infiltration rings were inserted into the rootzone and filled with water equivalent to 50mm of rainfall. The plots were measured for firmness and moisture content in the top 12.5mm using a turf penetrometer and an adapted soil moisture meter.

The university-based field studies performed during two consecutive turf growing seasons validate Terafirm’s ability to facilitate penetration of applied irrigation water and rain through turf surfaces into the underlying soil. Terafirm’s penetrant activity maintained less water in the surface profile of turf and increased turf firmness after a simulated saturating water event in the field trials described in this application. Full trials information is available on request from Headland Amenity.





Trial results showing turf firmness measured in the first 24 hours over 9 days of the trial commencement.



Trial results showing soil moisture content in the top 12.5mm measured in the first 24 hours of the trial commencement.

Adjuvants and Spray Aids

headland AMENITY PRODUCTS

Transport™ Ultra - Water conditioner

A NEW CLASS OF WATER CONDITIONER FEATURING A NON-IONIC SURFACTANT, WATER-CONDITIONING AGENTS AND AMMONIUM IONS IN A CONVENIENT PREMIX FORMULATION

Transport™ Ultra Key Points

- Reduces pH and lowers bicarbonate levels in spray tank solutions
- Increases availability and activity of pesticides, such as phenoxy herbicides and glyphosate
- Add to spray tank first to neutralise bicarbonate and lower pH before adding products to be sprayed
- Dosage test available to determine dosage rate for your specific water source
- Pack Size: 10L

Always add TU to the spray tank first

Traditional spray tank acidifiers merely reduce spray tank pH by adding hydrogen ions to the spray solution, however this has no effect on the hardness of the water. Transport Ultra reduces both spray tank water pH and hardness, providing significant benefits over traditional acidifiers. To understand these, it is first necessary to understand what is meant by 'water hardness'.

About water hardness

Water hardness is a method of classifying water in terms of its calcium and magnesium content and is expressed as an equivalent of calcium carbonate. Soft water contains low levels of calcium and magnesium, whereas hard water contains higher levels, as well as typically - bicarbonate.

Bicarbonate ions are known to react in the spray tank solution with many pesticide active ingredients, making them less available. Transport Ultra sequesters (locks up) bicarbonate ions, preventing them from reacting with the pesticide added to the spray tank. In addition, Transport Ultra 'protonates' (imparts a positive charge) to the materials added to the tank, making them more available to the grass plant, resulting in faster uptake and translocation. The difference between the mode of action of Transport Ultra and a traditional spray tank acidifier (based on Propionic acid) is shown below in actual analysis results of a hard water sample.

Sample	Untreated Hard Water	With Propionic Acid @ 0.1%	With Transport Ultra @ 0.25%
Bicarbonate (ppm)	228	286	45
pH	8.1	6	2.8

Usage notes

In order to increase the efficacy of a spray application, Transport Ultra should always be added to the spray tank first before the active ingredient(s). If a water sample has not been taken prior to the application to determine the effective dosage rate of Transport Ultra, Headland Amenity suggest using a 0.25% dilution in relation to the spray volume.

Transport™ Ultra inclusion rate per tank			
Water volume (L/Ha)	0.125%	0.25%	0.50%
200	250ml	500ml	1 litre
300	375ml	750ml	1.5 litres
400	500ml	1 litre	2 litres
500	625ml	1.25 litres	2.5 litres
600	750ml	1.5 litres	3 litres

	Transport™ Ultra dosage test result (example)				
	Untreated	0.125% Transport™ Ultra	0.25% Transport™ Ultra	0.50% Transport™ Ultra	Target levels
Magnesium	3	3	3	3	< 50mg/L
Calcium	153	152	151	148	< 100mg/L
Bicarbonate	368	172	0	0	50% reduction 184
pH	7.9	6.9	3.1	2.3	< 6.0
Hardness	394	391	389	381	n/a
Classification	Very hard	Very hard	Very hard	Very hard	n/a

Transport™ Ultra dosage test

To facilitate correct management of your spray tank water source, Headland Amenity offer a Transport Ultra dosage test, which involves taking a sample of the water source and dosing it at the laboratory with different dilution levels of Transport Ultra to determine the correct amount required to lower pH and lower bicarbonate levels. This test is free of charge to customers of Headland Amenity.

Super Signal™ - Spray Pattern Indicator

A NON-TOXIC, SUPER CONCENTRATED, SPRAY PATTERN INDICATOR

Super Signal™ Key Points

- Super concentrated blue and green spray pattern indicator
- Provides excellent indicator properties at very low inclusion rates
- Typically used from 100ml to 250ml per 100L of spray solution
- Non-toxic, degraded by ultra-violet light
- Super Signal pack size 5L

Super Signal indicators eliminate waste due to spray overlap and highlight drift and potential nozzle blocking, a key function with the increasing use of shrouded booms. Super Signal dissipates with sunlight or moisture and will not permanently stain vegetation, soil or human skin.

Super concentrated formula – low inclusion rate

Super Signal Blue or Green are extremely concentrated spray pattern indicators. During the product assessment period, field trials showed that the inclusion rate can be significantly reduced when compared with many competitor indicators.

For the first usage, Headland Amenity suggest using Super Signal Blue or Green at the same inclusion rate as your normal pattern indicator to gauge just how concentrated the formulation actually is. Rate adjustment can then be made to achieve the required depth of colour.

	Super Signal™ Blue or Green
Areas of Use	Fine Turf. Course Turf
Application Rate	100 to 250ml per 100L of spray solution

Runway™ - Foam bout marker

FAST-DISSIPATING, FOAM BOUT MARKER SPECIFICALLY DESIGNED FOR USE IN AMENITY SITUATIONS

Runway™ Key Points

- Specially formulated for use in amenity applications
- High visibility foam for 20 minutes
- Safe on sensitive grasses, will not discolour turf
- Non-corrosive, non-flammable, non-staining
- Pack size 2.5L

Runway produces a visible indication (by way of foam blobs) of treated areas, important to help avoid spray overlap and possible turf damage. For use through foam bout marker equipment.

	Runway™
Areas of Use	Turf and Lawns
Inclusion rate	1.20%
Rate per litre of water	12ml

Erase™ - Liquid spray tank cleaner

A POWERFUL, LIQUID SPRAY TANK CLEANER FORMULATED TO REMOVE RESIDUES AND INCREASE RINSATE PH

Erase™ Key Points

- Advanced surfactant system that penetrates and removes dried-on spray-tank residues
- Emulsifier technology solubilises oily residues for easier purging of the system
- Increases rinsate solution pH levels to rapidly accelerate the breakdown of vulnerable pesticides
- Anti-corrosion inhibitors to protect equipment pumps, seals and plumbing
- Pack size - 1L

Erase is a powerful spray system cleaner that emulsifies oily residues in sprayer lines and hoses while elevating rinsate pH to degrade vulnerable products. When used in conjunction with proper sprayer clean technique, Erase ensures more thorough clean-outs. Erase is also effective at removing stains left behind by pigments and dyes from sprayer and equipment surfaces.

	Erase™
Dilution rate	0.5% of spray tank volume i.e. 500ml per 100L of spray volume

Tangent SDR® - Natural spray additive

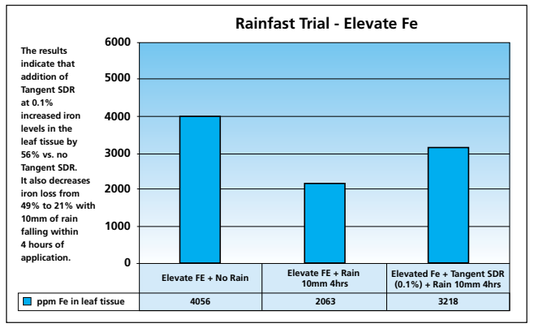
NATURAL SPRAY ADDITIVE FOR DRIFT REDUCTION, IMPROVED SPRAY RETENTION AND NUTRIENT UPTAKE

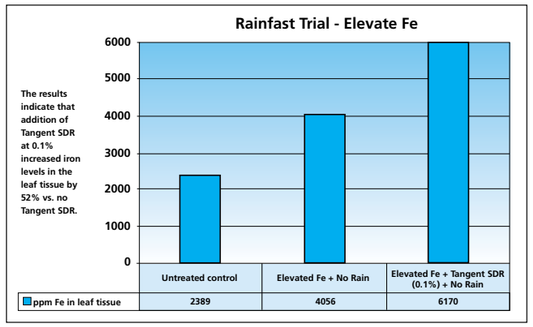
Tangent SDR® Key Points

- Natural sticker and spreader obtained from pine resin, 100% natural origin
- Improved droplet retention - increases the amount of active substance on the plant
- Fixative - increases resistance to active substance wash-off
- Anti-drift - regulates droplet size, reducing drift
- Pack size 5L

Tangent SDR® utilises the natural spreading and sticking effects of Terpineol to enhance spray retention on the grass leaf and improve nutrient uptake of the applied spray. In simulated rainfall trials, Tangent SDR® increased the iron content of an applied foliar iron spray by greater than 50% versus non-inclusion when used at 0.1% of spray volume with 10mm of rain simulated after 4hrs.

In Headland Amenity's own trials using Tangent SDR and Elevate Fe, incorporation of Tangent SDR increased leaf tissue iron levels by 52% vs. Elevate Fe applied on its own (see below).





	Tangent SDR®
Application rate	0.1% of spray volume
Equivalent to:	300ml of Tangent SDR ® in 300L of spray solution
Pack size	5L

Usage Period	J	F	M	A	M	J	J	A	S	O	N	D
Tangent SDR®	●	●	●	●	●	●	●	●	●	●	●	●

Knockdown™ - Liquid de-foamer

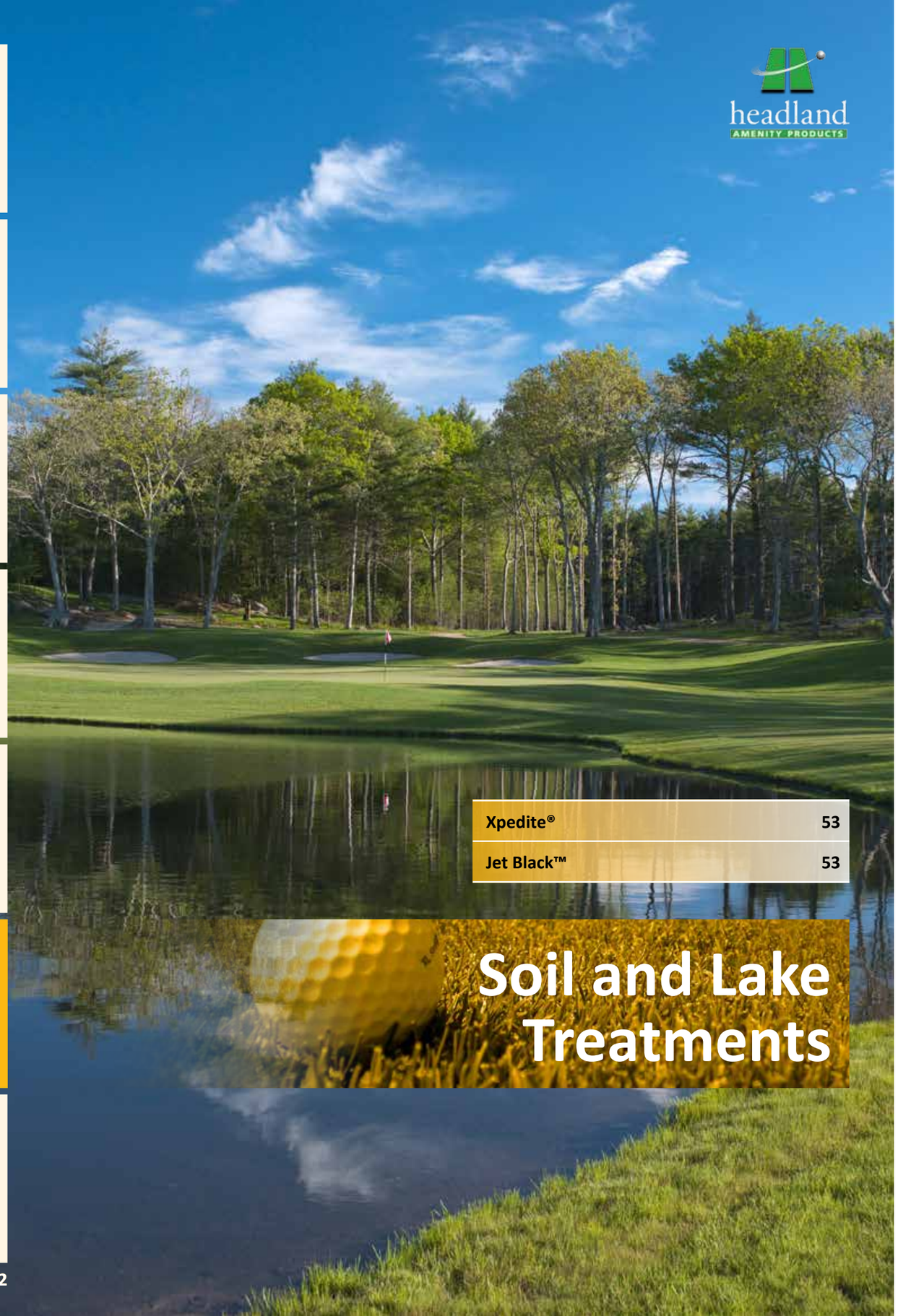
FOAM SUPPRESSANT AND ANTIFOAMING AGENT

Knockdown™ Key Points

- General purpose antifoamer and de-foamer
- Liquid formulation prevents and removes foam
- Use as a preventative or to cure existing foaming problems

Knockdown is a liquid de-foamer, active against foam produced when mixing many amenity chemicals. Easy to apply, it can be used to prevent or cure foaming problems.

	Knockdown™	
Areas of Use	All areas and uses	
Application usage	**Antifoam**	**De-foamer**
Application rates	30ml to 190ml in 500L water	60ml to 250ml in 500L water
Rate per 100L of spray	6 to 38ml	12 to 50ml
Rate per 20L knapsack spray	1.2 to 7.6ml	2.4 to 10ml
Pack size	1L	1L



Soil and Lake Treatments

Xpedite® - Soil amendment

XPEDITE® IS A GRANULAR SOIL AMENDMENT PRODUCT THAT INTRODUCES NON-COMPACTING PORE SPACE INTO PROBLEM ROOTZONES

Xpedite® Key Points

- Lightweight, porous granule to help improve problem soils
- Increases the oxygen holding capacity of soils
- Helps improve drainage and permeability
- Helps reduce compaction
- Balances air and water in the rootzone, encouraging rooting
- Can increase water and nutrient availability in sandy soils
- Granule sizing matches top dressing and rootzone particle sizing

Xpedite is a stable, durable granule produced from diatomaceous earth, featuring a porous internal structure, which allows it to retain both air and water.

Incorporation can be as a straight material during vertidraining or 'Drill & Fill' operations, or mixed with a suitable sand top-dressing. Xpedite improves rootzone characteristics by facilitating water movement, increasing oxygen-holding potential and retaining water within its structure, which is available to the grass plant during dry periods of weather.

The graphic below shows how Xpedite is compatible with topdressing sands for incorporation during solid-tining, vertidraining and 'Drill & Fill' with over 90% size grading in the medium to coarse range. It also highlights the increased potential for Xpedite ™ to hold more water and air within its porous structure compared to sand alone.

Areas of use

- Golf and bowling greens , tees, winter sports pitches and lawns
- On compacted, poorly draining rootzones, with low oxygen content
- On wet areas of turf to facilitate better water movement and increase the water holding capacity of the rootzone before it reaches field capacity
- On raised areas of greens that exhibit faster dry down characteristics
- As a surface dressing to discourage algae colonisation

Xpedite® application

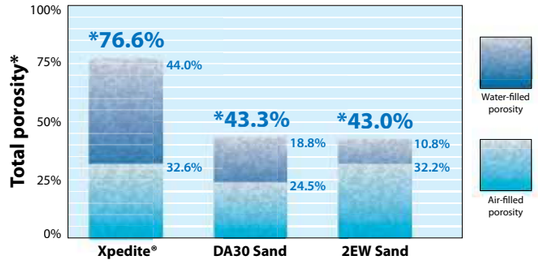
The exact quantity of Xpedite required for incorporation after aeration is dependent upon the tine size, block spacing and depth. For a guideline, the following quantities are typically used when 100% Xpedite is incorporated:

Hollow Coring/Solid Tining - 10 to 14 x 20kg bags per 500m^2

Vertidraining - 20 to 26 x 20kg bags per 500m^2

For best results apply evenly to a dry surface and use a 'Z' brush, Sweep & Fill or drag mat to incorporate into the aeration holes.

Xpedite® porosity comparison with sand



Potential dust hazard: Personal protective equipment is recommended including particle mask, gloves and eye protection. Please refer to the Safety Data Sheet, which is available on request.

Jet Black™ - EZ Solupak

NATURAL EFFECT LAKE DYE

Jet Black™ Key Points

- Black, reflective colour
- Helps combat algae and submerged weeds
- Unique packaging that eliminates the risk of staining during handling
- Non-toxic

Jet Black EZ Solupak is a blend of environmentally friendly, non-toxic, watersoluble black dyes formulated to reduce sunlight penetration. Use can help to control algae and submerged weeds by blocking light and thus reducing photosynthesis.

Jet Black imparts a natural black colour when applied to any water feature. The Jet Black EZ SoluPaks are protected by a unique, waterproof, foil lined overpack to prevent accidental staining when handling.

Application

Jet Black is packed in cartons containing 6 x 148g EZ Solupak sachets. Each carton will treat 7400m^3 of water in total. Water temperature and convection will influence dissolution and dispersion of Jet Black. High levels of chlorine in the water may reduce the longevity of Jet Black.

Jet Black™	Litres of water treated	Gallons of water treated	Cubic metres of water treated
1 sachet	1,233,000	272,000	1,233
6 sachets	7,400,000	1,633,000	7,400

Information

CLP - Hazard warning symbols on labels and updated Safety Data Sheets (SDS)

INFORMATION

CLP - hazard warning symbols on labels and Safety Data Sheets

The red, diamond CLP symbols will now be a familiar sight on Headland Amenity product labels and Safety Data Sheets, having been required to fully replace the previous orange, square CHIP symbols in 2017.

CLP (Classification, Labelling and Packaging) came into force across Europe in 2009, directed by the United Nations, to help in the creation of a "globally harmonised" set of warning symbols that would be applied to all product labels and recognised around the world.

Products must be classified to determine how hazardous they are for both use and transport and this information is also used when completing CoSHH assessments. If you don't have a copy of a particular product SDS, you can request this anytime by emailing us at info@headlandamenity.com

Some of the CLP hazard symbols and what they mean, which may be found on Headland Amenity product labels and Safety Data Sheets:

Old CHIP hazard symbol	Hazard	New CLP hazard symbol
	Harmful/ irritant/toxic	
	Corrosive	
	Dangerous to the environment	
	Oxidising	

The final deadline in the EU for the application of the CLP legislation in the labelling of all products of 1st June 2015 has now passed. This means you now need to ensure that all the SDS you are receiving for the products you use are CLP-compliant. If this is not the case, you will not have the appropriate safety information or be able to complete your CoSHH assessments correctly.

However, some old stock with the previous orange warning symbols could remain in circulation but should have been re-labelled by 1st June 2017.

Products must be classified to determine how hazardous they are for both use and transport. The new CLP labelling communicates this along with the accompanying safety data sheet (SDS), which now must also be updated to meet the CLP legislation.

This new legislation has resulted in the replacement of the orange hazard warning symbols by the new, red diamond symbols, which will eventually be used on all products, around the world.

Same product, different symbols...

For Headland Amenity products, nothing else has changed - the products will remain the same formulations that you have always used, the only difference being any warning symbols on the labels will be new. This system is believed to be a universally clearer way of presenting any potential hazards to you, the user, and it is obviously better that all companies use the same symbols to communicate the same potential hazards.

However, you may find that a product that previously didn't have a hazard warning symbol under the old system will now carry one to meet the new CLP legislation. This is because for some product constituents, the European set concentration level at which they apply a hazard warning to the product has been lowered, resulting in some products now falling into hazard categories when they didn't previously, but with no change at all to the original product formulation.

As mentioned above, it is not just the labels that have changed, the accompanying SDS will also have been updated to include the CLP hazard warning symbols and safety information. If you don't have a copy of a particular product SDS, you can request this anytime by emailing us at info@headlandamenity.com.

Spreader settings - Granular products

INFORMATION

Multigreen® product range

Product	Appl. Rate (g/m²)	Accupro 2000				Ev-n-Spred C24			Vicon Type 03	
		Single Pass Letter	Double Pass Letter	Cone No.	Spread width (m)	Single Pass	Double Pass	Spread width (m)	Setting @ 7kph	Spread width (m)
Multigreen 627 20-0-32	30	R ½	O	3	4.4	17	14	3.6	30	12
	35	T ½	O ½	3	4.4	18	14 ½	3.6	34	12
	40	V	P	3	4.4	20	15	3.6	-	-
	45	V ½	P ½	3	4.4	21	15½	3.6	-	-
	50	X	Q ½	3	4.4	22	16	3.6	-	-
Multigreen 526 28-3-15 28-0-0	25	S	-	3	4.4	15	12	3.6	31	12
	30	S ½	Q	3	4.4	16½	13½	3.6	33	12
	35	T	Q ½	3	4.4	17½	14	3.6	38	12
Multigreen 526 15-0-22	25	P	M	3	5.0	15	12	3.6	28	12
	30	Q	M ½	3	5.0	16½	13½	3.6	30	12
	35	R	N ½	3	5.0	17½	14	3.6	34	12
Multigreen Fine 25-5-14	25	O ½	M	5	4.4	14½	11 ½	3.6	-	-
	30	Q	M ½	5	4.4	16	12 ½	3.6	-	-
	35	R	N	5	4.4	16½	13	3.6	-	-
Multigreen Fine 19-0-30	25	O	L ½	4	4.4	13	11	3.6	-	-
	30	P	M	4	4.4	15	11½	3.6	-	-
	35	Q	M ½	4	4.4	16	12	3.6	-	-
Multigreen Mini 24-0-24	25	N ½	L	4	4.4	13½	10	3.6	-	-
	30	O ½	L ½	4	4.4	14	10 ½	3.6	-	-
	35	P ½	M	4	4.4	15	12	3.6	-	-
	40	Q	M ½	4	4.4	16½	13	3.6	-	-
Multigreen Mini 12-0-43	25	N ½	L	4	4.4	13½	10	3.6	-	-
	30	O ½	L ½	4	4.4	14	10½	3.6	-	-
	35	P ½	M	4	4.4	15	12	3.6	-	-
	40	Q	M ½	4	4.4	16½	13	3.6	-	-

Outfield range

Product	Appl. Rate (g/m²)	Accupro 2000				Ev-n-Spred C24			Vicon Type 03		Amazon ZA-F	
		Single Pass Letter	Double Pass Letter	Cone No.	Spread width (m)	Single Pass	Double Pass	Spread width (m)	Setting @ 7kph	Spread width (m)	Setting @ 10kph	Spread width (m)
Quickstart Maxi Plus 22-5-5	25	R ½	N ½	1	4.8	19	15½	4.0	30	12	14	12
	30	S	O ½	1	4.8	19½	16	4.0	36	12	15	12
	35	T ½	P	1	4.8	20	17	4.0	40	12	16	12
Blaukorn 15-3-20	25	R ½	N ½	1	4.8	19	15½	4.0	30	12	25.5	12
	30	S	O ½	1	4.8	19½	16	4.0	36	12	27.5	12
	35	T ½	P	1	4.8	20	17	4.0	40	12	29	12
Easygreen Mini 21-5-10 12-12-17	15	O ½	-	1	5.6	13½	-	3.6	24	12	-	-
	20	Q	L ½	1	5.6	15	12½	3.6	27	12	-	-
	25	R	N	1	5.6	16	13	3.6	32	12	-	-

Organic Soil Conditioners range

Product	Appl. Rate (g/m²)	Accupro 2000				Ev-n-Spred C24		
		Single Pass Letter	Double Pass Letter	Cone No.	Spread width (m)	Single Pass	Double Pass	Spread width (m)
Naturvigor Granule	35	V	P	4	4	21	14½	3.6
	40	X	Q	4	4	22	15½	3.6
	50	Y	R	4	4	23	16½	3.6
C-Complex 4-3-4 5-2-10 7-0-7	25	M	J ½	8	3.3	14	11	2.4
	30	N	K	8	3.3	15	11½	2.4
	35	O	K ½	8	3.3	15½	12	2.4
	40	O ½	L	8	3.3	16	12½	2.4
	50	P ½	M	8	3.3	17	14	2.4
CalciComplex	35	P	M	8	3.3	14	12	3.6
	50	R	N	8	3.3	18	15	3.6
	70	-	P	8	3.3	-	17	3.6

C-Complex® Sport

Product	Appl. Rate (g/m²)	Accupro 2000				Ev-n-Spred C24			Vicon Type 03	
		Single Pass Letter	Double Pass Letter	Cone No.	Spread width (m)	Single Pass	Double Pass	Spread width (m)	Setting @ 10kph	Spread width (m)
C-Complex Sport 14-2-5	25	P	M ½	3	4.4	17	14	3.6	28	12
	30	Q ½	N	3	4.4	18	14 ½	3.6	30	12
	35	R ½	N ½	3	4.4	19	15	3.6	32	12

Spreader settings - Granular products

INFORMATION

XTEND® product range

Product	Appl. Rate (g/m²)	Accupro 2000				Ev-n-Spred C24			Vicon Type 03		Amazon ZA-F	
		Single Pass Letter	Double Pass Letter	Cone No.	Spread width (m)	Single Pass	Double Pass	Spread width (m)	Setting @ 7kph	Spread width (m)	Setting @ 7kph	Spread width (m)
XTEND 46-0-0 Granular	10	M	-	6	4.6	12	-	2.4	-	-	-	-
	15	O	L	6	4.6	13	11	2.4	20	12	11	12
	20	Q	M	6	4.6	14	12	2.4	23	12	14	12
XTEND 24-4-4	25	R	N	3	4.4	15	12	3.6	32	12	-	-
	30	S	N ½	3	4.4	15½	13½	3.6	37	12	-	-
	35	T	O ½	3	4.4	16	14	3.6	41	12	-	-
XTEND 15-2-20 10-10-10	20	O	M	3	4.4	16	13½	3.6	26	12	-	-
	25	P	M ½	3	4.4	17	14	3.6	28	12	-	-
	30	Q ½	N	3	4.4	18	14½	3.6	30	12	-	-
	35	R ½	N ½	3	4.4	19	15½	3.6	32	12	-	-
XTEND FINE 26-3-3	15	M	J ½	4	4.4	14	11	3.6	-	-	-	-
	20	N	K ½	4	4.4	15	12	3.6	-	-	-	-
	25	O	L	4	4.4	16	12 ½	3.6	-	-	-	-

H-Cote™ Mini

Product	Appl. Rate (g/m²)	Accupro 2000				Vicon Type 03			
		Single Pass Letter	Double Pass Letter	Cone No.	Spread width (m)	Wheel to Wheel	Spread to Spread	Spread width (m)	Forward speed (kph)
H-Cote Mini	15	L	I ½	7	4	n/a	19	9	8
	25	O	K	7	4	18	25	9	8
	35	R	M ½	7	4	21	29	9	8

Multiverdo®

Product	Appl. Rate (g/m²)	Accupro 2000				Ev-n-Spred C24		
		Single Pass Letter	Double Pass Letter	Cone No.	Spread width (m)	Single Pass	Double Pass	Spread width (m)
Multiverdo 13-0-46	10	11	I ½	5	4.4	11 ½	10	3.6
	15	L	J	5	4.4	12 ½	10 ½	3.6
	20	L ½	K	5	4.4	13	11 ½	3.6
	25	M	K ½	5	4.4	14	12	3.6
	30	N	L	5	4.4	15	12 ½	3.6

Greentec® product range

Product	Appl. Rate (g/m²)	Accupro 2000				Ev-n-Spred C24		
		Single Pass Letter	Double Pass Letter	Cone No.	Spread width (m)	Single Pass	Double Pass	Spread width (m)
Greentec 14-2-6 13-3-13 6-5-18	15	K ½	-	5	3.5	12	-	2.4
	20	L ½	J	5	3.5	13	11	2.4
	25	M ½	K	5	3.5	14½	11½	2.4
	30	N	K ½	5	3.5	15	12	2.4
	35	O	L	5	3.5	15½	12½	2.4
	40	P	L ½	5	3.5	16	13	2.4
Mosskiller Pro 4-0-4+9Fe	15	K	-	2	3.0	11½	-	2.4
	20	L	J	2	3.0	12½	10½	2.4
	25	L ½	J ½	2	3.0	13½	11	2.4
	30	M	K	2	3.0	14	11½	2.4
	35	N	K ½	2	3.0	15	12	2.4
Effective moss control rate	40	O	L	2	3.0	15½	12½	2.4

TriCure AD™ product range

Product	Appl. Rate (g/m²)	Accupro 2000				Ev-n-Spred C24		
		Single Pass Letter	Double Pass Letter	Cone No.	Spread width (m)	Single Pass	Double Pass	Spread width (m)
TriCure Granular	12	J ½	-	5	4.0	12½	-	2.4
	24	M ½	J ½	5	4.0	14½	11	2.4

To download this information to your mobile device scan the QR code or visit http://tinyurl.com/spreader-settings

Nutrient input charts

INFORMATION

For granular, liquid and water-soluble fertilisers

Use the following tables to show how much nutrient (N, K_2O or P_2O_5) is applied, depending on the product analysis.

Use the table below to calculate the input of nutrients in kg/ha for granular fertilisers e.g. 14% N applied at 30g/m² provides 42kg of N per hectare.

Amount of nutrient supplied by granular fertilisers

Product Analysis %	Application rate g/m²								
	10	15	20	25	30	35	40	45	70
1	1	1.5	2	2.5	3	3.5	4	4.5	7
2	2	3	4	5	6	7	8	9	14
3	3	4.5	6	7.5	9	10.5	12	13.5	21
4	4	6	8	10	12	14	16	18	28
5	5	7.5	10	12.5	15	17.5	20	22.5	35
6	6	9	12	15	18	21	24	27	42
7	7	10.5	14	17.5	21	24.5	28	31.5	49
8	8	12	16	20	24	28	32	36	56
9	9	13.5	18	22.5	27	31.5	36	40.5	63
10	10	15	20	25	30	35	40	45	70
11	11	16.5	22	27.5	33	38.5	44	49.5	77
12	12	18	24	30	36	42	48	54	84
13	13	19.5	26	32.5	39	45.5	52	58.5	91
14	14	21	28	35	42	49	56	63	98
15	15	22.5	30	37.5	45	52.5	60	67.5	105
16	16	24	32	40	48	56	64	72	112
17	17	22.5	34	42.5	51	59.5	68	76.5	119
18	18	27	36	45	54	63	72	81	126
19	19	28.5	38	47.5	57	66.5	76	85.5	133
20	20	30	40	50	60	70	80	90	140
21	21	31.5	42	52.5	63	73.5	84	94.5	147
22	22	33	44	55	66	77	88	99	154
23	23	34.5	46	57.5	69	80.5	92	103.5	161
24	24	36	48	60	72	84	96	108	168
25	25	37.5	50	62.5	75	87.5	100	112.5	175
26	26	39	52	65	78	91	104	117	182
27	27	40.5	54	67.5	81	94.5	108	121.5	189
28	28	42	56	70	84	98	112	126	196
29	29	43.5	58	72.5	87	101.5	116	130.5	-
30	30	45	60	75	90	105	120	135	-
31	31	46.5	62	77.5	93	108.5	124	139.5	-
32	32	48	64	80	96	112	128	144	-
33	33	49.5	66	82.5	99	115.5	132	148.5	-
34	34	51	68	85	102	119	136	153	-
35	35	52.5	70	87.5	105	122.5	140	157.5	-
36	36	54	72	90	108	126	144	162	-
37	37	55.5	74	92.5	111	129.5	148	166.5	-
38	38	57	76	95	114	133	152	171	-
39	39	58.5	78	97.5	117	136.5	156	175.5	-
40	40	60	80	100	120	140	160	180	-
41	41	61.5	82	102.5	123	143.5	164	184.5	-
42	42	63	84	105	126	147	168	189	-
43	43	64.5	86	107.5	129	150.5	172	193.5	-
44	44	66	88	110	132	154	176	198	-
45	45	67.5	90	112.5	135	157.5	180	-	-
46	46	69	92	115	138	161	184	-	-

Nutrient input information - liquid fertilisers

Product	Analysis	Application Rate (L/ha)	Nutrient input kg/ha		
			N	P_2O_5	K_2O
Protec® Plus	28-0-0	10	3.5	-	-
		20	7.0	-	-
		40	14.0	-	-
		60	21.0	-	-
Protec® Plus	15-0-12	10	2.1	-	1.7
		20	4.1	-	3.3
		40	8.3	-	6.6
		60	12.4	-	9.9
Protec® Plus	16-4-8	10	1.9	0.5	1.0
		20	3.9	1.0	1.9
		40	7.7	1.9	3.9
		60	11.6	2.9	5.8
Protec®	10-0-10	10	1.0	-	1.0
		20	2.0	-	2.0
		40	4.0	-	4.0
		60	6.0	-	6.0
Protec®	6-0-12	10	0.6	-	1.2
		20	1.2	-	2.4
		40	2.4	-	4.8
		60	3.6	-	7.2
Protec®	0-0-25	10	-	-	3.6
		20	-	-	7.3
		40	-	-	9.4
		60	-	-	14.5
XTEND® Liquid Hi-N	34-0-0	10	3.4	-	-
		20	6.8	-	-
		40	13.6	-	-
		60	20.4	-	-
Seamac Proturf Fe	2.1-0-0	10	0.25	-	-
		20	0.5	-	-
		30	0.75	-	-
Liquid Turf Hardener	10-0-0	10	1.0	-	-
		20	2.0	-	-
Turfite	7-24-0	10	0.7	2.4	-
		20	1.4	4.8	-
		30	2.1	7.2	-

Nutrient input information - water-soluble fertilisers

Product	Analysis	Application Rate (kg/ha)	Nutrient input kg/ha		
			N	P_2O_5	K_2O
XTEND® Soluble	46-0-0	20	9.2	0	0
		40	18.4	0	0
		60	27.6	0	0
Solufeed Hi-K	13-0-45	20	2.6	0	9
		40	5.2	0	18
		60	7.8	0	27
Solufeed Hi-N	28-7-14	20	5.6	1.4	2.8
		40	11.2	2.8	5.6
		60	16.8	4.2	8.4
Solufeed Hi-P	13-40-13	20	2.6	8	2.6
		40	5.2	16	5.2
		60	7.8	24	7.8
Solufeed NPK	14-5-28	20	2.8	1.0	5.6
		40	5.6	2.0	11.2
		60	8.4	3.0	16.8
Solufeed NK	15-0-25	20	3	0	5
		40	6	0	10
		60	9	0	15

Suggested tank-mixes

INFORMATION

Headland Amenity have pioneered the application of multiple products within the same tank-mix to ease application, save time and money and maximise product efficacy.

All these tank-mixes are trialled in the laboratory for spray tank compatibility and in the field during extreme conditions and at higher rate replicates, to confirm performance.

Many Headland liquid products are tank-mix compatible. For further information scan the QR Code or visit http://tinyurl.com/tank-mixing

Denotes tank-mix sequence

1 First product to be added to half filled tank under agitation.

Early season green up and growth

Tees, Fairways, Semi-Rough and Sports Pitches

Grass growth initiation early in the year. Applications from mid-February weather permitting.

1 Headland Soluble Iron **12 to 20kg/ha** + 2 XTEND® High-N 34-0-0 **40 to 60L/ha** in **300 to 400L/ha Spray volume**

Pre-Event green up with Clipless NT

Tees, Fairways, Semi-Rough and Sports Pitches

Pre-tournament green up or spring / summer feed without excessive clippings generation. Applications from mid-April.

1 XTEND® Soluble 46-0-0 **20 to 40kg/ha** + 2 Elevate Fe® **20 to 40L/ha** + 3 Headland Clipless NT® **750 to 1,500ml/ha** in **300 to 400L/ha Spray volume**

Cool temperature hardener / Tonic

Greens and Tees

Low soil temperature, turf hardener, proven in independent trials to suppress disease. Applications from Sept. to April.

1 Liquid Turf Hardener **20L/ha** + 2 Turfite® **20L/ha** + 3 Seamac® Proturf Fe **30L/ha** in **400L/ha Spray volume**

Summer feed with Clipless NT

Greens

Summer fertilisation to provide consistent growth without flushes. Applications from end May to end August.

1 Solufeed® NK 15-0-25 **10 to 20kg/ha** + 2 Solufeed® TeMag™ Elite **6kg/ha** + 3 Protec Plus® 28-0-0 **20 to 40L/ha** + 4 Headland Clipless NT® **200 to 400ml/ha** in **400L/ha Spray volume**

Stress recovery

Greens and Tees

Recovery tank-mix from drought, nematode, disease stress. Applications from April to September.

1 Solufeed TeMag™ Elite **6kg/ha** + 2 Seamac® Ultra Plus **10-20L/ha** + 3 Turfite® **30L/ha** in **400L/ha Spray volume**

Outfield Green up with Wetting Agent

Tees, Fairways, Semi-Rough and Sports Pitches

Outfield green up or spring / summer feed with wetting agent . Applications from Mid-April. Irrigation or rainfall required.

1 XTEND® Soluble **20-40kg/ha** + 2 TriCure AD™ **2.5L/ha** + 3 Elevate Fe **20L/ha** in **400L/ha Spray volume**

Read more about using Tricure AD at light rates on outfield turf on page 45.

Fertiliser calculations - Planning your NPK nutrient input

INFORMATION

Granular fertilisers

To accurately plan turf fertiliser input it is important to know how much actual nutrient is being applied in any given treatment and over the course of a season, this can be calculated in the following ways.

Fertiliser analyses and inputs are expressed in elemental form for nitrogen (N), but in oxide form (P_2O_5 & K_2O) for phosphorus and potassium.

To calculate actual elemental input; To convert P_2O_5 to elemental P - multiply by 0.44.

To convert K_2O to elemental K - multiply by 0.83.

This can be useful when considering other constituents of fertilisers. For example, many granular fertilisers contain high levels of sulphur (S) expressed in the oxide form (SO_3).

To convert SO_3 to elemental S, – multiply by 0.4.

Granular fertilisers - Formula

To calculate the kg of nutrient applied per hectare, use;

Application rate (in g/m²) x % nutrient content/10

Example:

An application of Greentec 6-5-18 applied at 25g/m²

25 x 6/10 = 15kg N per hectare

25 x 5/10 = 12.5kg P_2O_5 per hectare

25 x 18/10 = 45kg K_2O per hectare

Water-soluble fertilisers

Water-soluble fertilisers are treated as granular fertilisers.

However, where application rates are in kg / ha, use the following formula:

Water-soluble fertilisers - Formula

Application rate (in kg/ha) x % nutrient content / 100

Example:

An application of Solufeed NK 15-0-25 water-soluble fertiliser applied at 40kg/ha

40 x 15/100 = 6kg N per hectare

40 x 25/100 = 10kg K_2O per hectare

Liquid fertilisers

Liquid Fertilisers present a different challenge because their analysis can be declared in two separate ways - weight/weight (w/w) or weight/volume (w/v). The difference between the nutrient content expressed in w/w and w/v is actually the specific gravity of the product.

To calculate the kg per hectare of nutrient applied by a liquid fertiliser where the analysis is declared as weight/weight, you use the calculation shown in the box on the right. It is necessary to know the specific gravity of the product as it forms part of the calculation.

To calculate the kg per hectare of nutrient applied by a liquid fertiliser where the analysis is declared as weight/volume, you simply multiply the % nutrient content by the application rate (in l/ha) and divide by 100.

So for example a 15% nitrogen liquid fertiliser (w/v) and applied at 40 litres per hectare would be;

15 x 40 / 100 = 6 kg per hectare of nitrogen applied.

Liquid fertilisers - w/w Formula

Application rate (in litres per hectare) x Specific Gravity of the liquid = W and then

W x % nutrient content/100

Example:

An application of 15-0-12 liquid applied at 100 litres per hectare. (S.G. = 1.36)

100 x 1.36 (Specific Gravity) = 136

136 x 15/100 = 20.4kg N per hectare

136 x 12/100 = 16.3kg K_2O per hectare

Convert U.S./Imperial to Metric

U.S./Imperial	1 U.S. gallon	1 U.S. fl.oz	1000 ft²	1lb/1000 ft²	1 Imp.gal	1 Imp.fl.oz	1 acre	2.471 acres	1oz	1lb
Metric	3.785 litres	29.574ml	92.9m²	48.83kg/ha	4.546 litres	28.41ml	4047m²	1 hectare	28.35g	0.4536kg

More conversion information is available at **www.convert-me.com**

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