

Towards more sustainable use of pesticides on golf courses - Integrated disease management for turf

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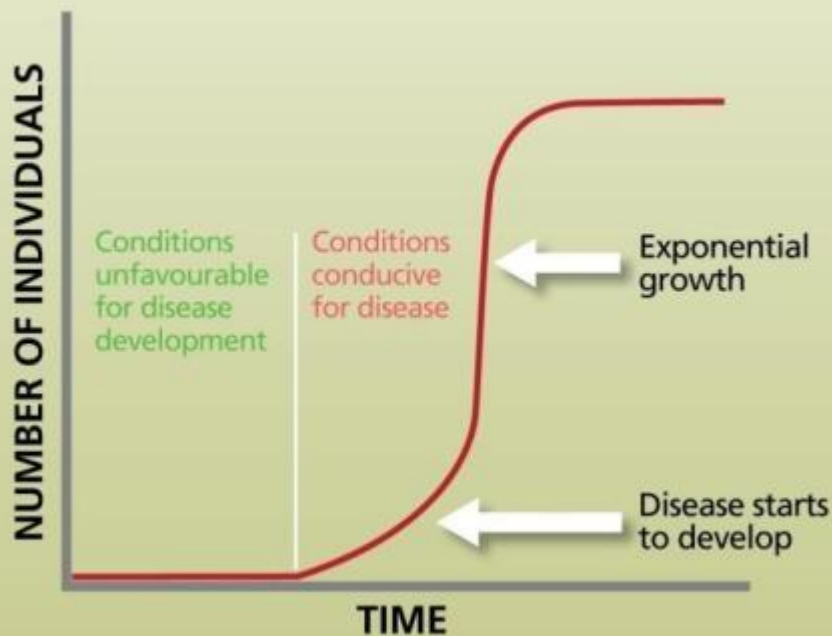
Classification: Public

Integrated Turf Management



Development of disease

Microdochium patch (*Microdochium nivale*)

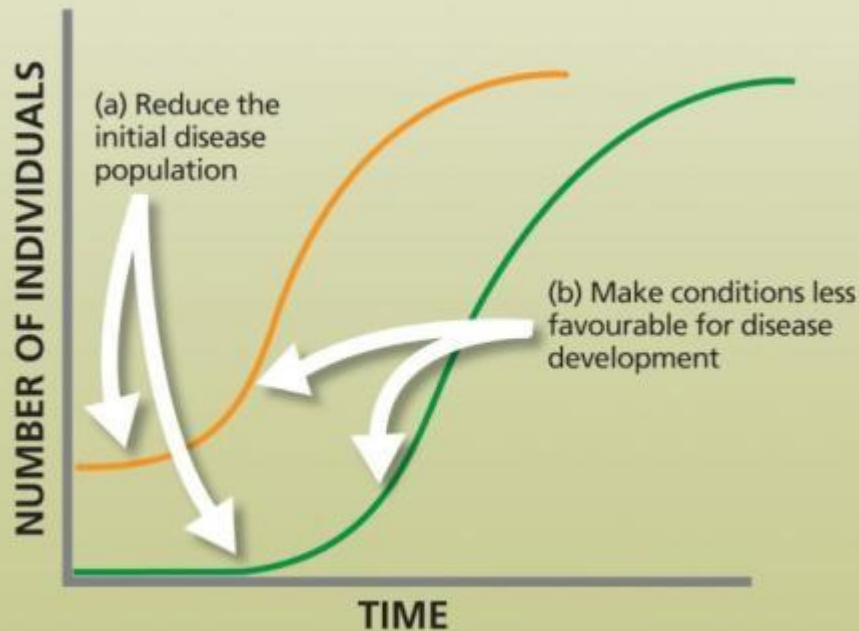


Courtesy of Professor Karl Danneberger (Ohio State University)

- Disease population builds to a critical point
- Correct environmental conditions = exponential growth of the disease population

Integrated disease management

Microdochium patch (*Microdochium nivale*)



Courtesy of Professor Karl Danneberger (Ohio State University)

- Reduce initial levels of disease in turf
- Change environmental conditions
- Delay outbreak



Know your enemy

Know your enemy – Microdochium patch

Scientific name: *Microdochium nivale*

- Survives in infected plants and dead debris in thatch and soil
- When conditions are conducive spores germinate and mycelium grow from dead debris to infect plants
- Disease spreads rapidly under wet overcast conditions
- Temperature range 0 - 16°C
- Most severe in slow growing turf :
 - High humidity
 - High levels of thatch
 - Under snow cover
 - Repeated frosts
 - Cold fogs
 - Drizzly rain



Fusarium risk factors.....

GRASS SPECIES

Poa annua = highest risk

WEATHER AND GROWING CONDITIONS

High risk = wet and humid conditions

Turf able to grow away from disease



PLANT HEALTH AND NUTRITION

Healthy grass is best able to resist
Fusarium

Under-fertilization increases risk
Over-fertilization increases risk

THATCH

Source of inoculum, reduces air and
water movement



Fungicide choice and timing

Select the right fungicide for the right disease

Leaf Spot



Microdochium Patch



Dollar Spot



Anthracnose

Contact or Systemic?



Active growth

Slow/zero growth

April/October

Nov/March

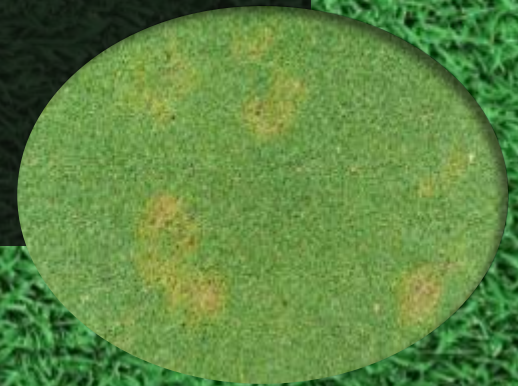
Systemic

Contact

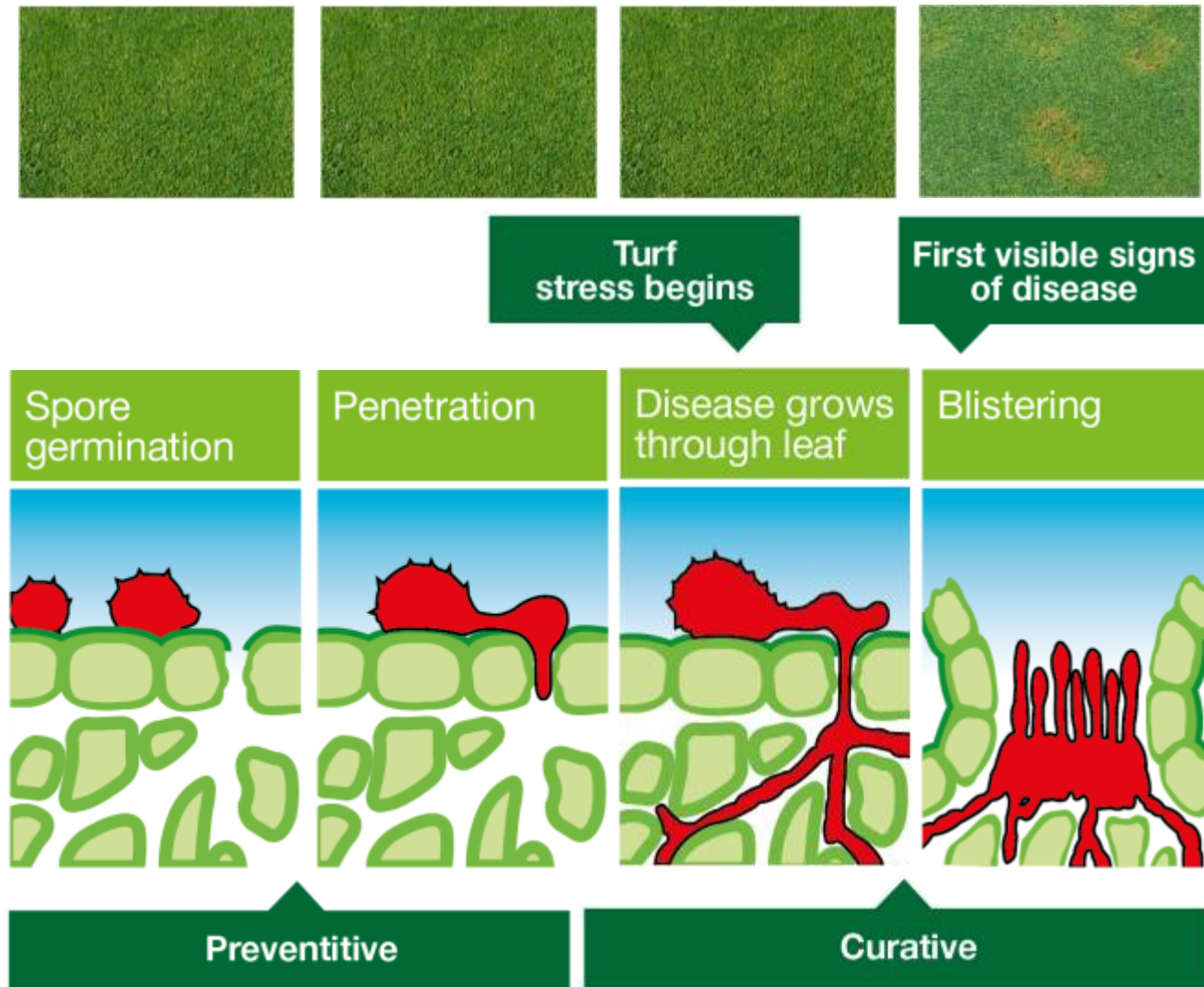
Preventative Vs curative strategies

Trials have shown that carefully timed fungicide applications can:

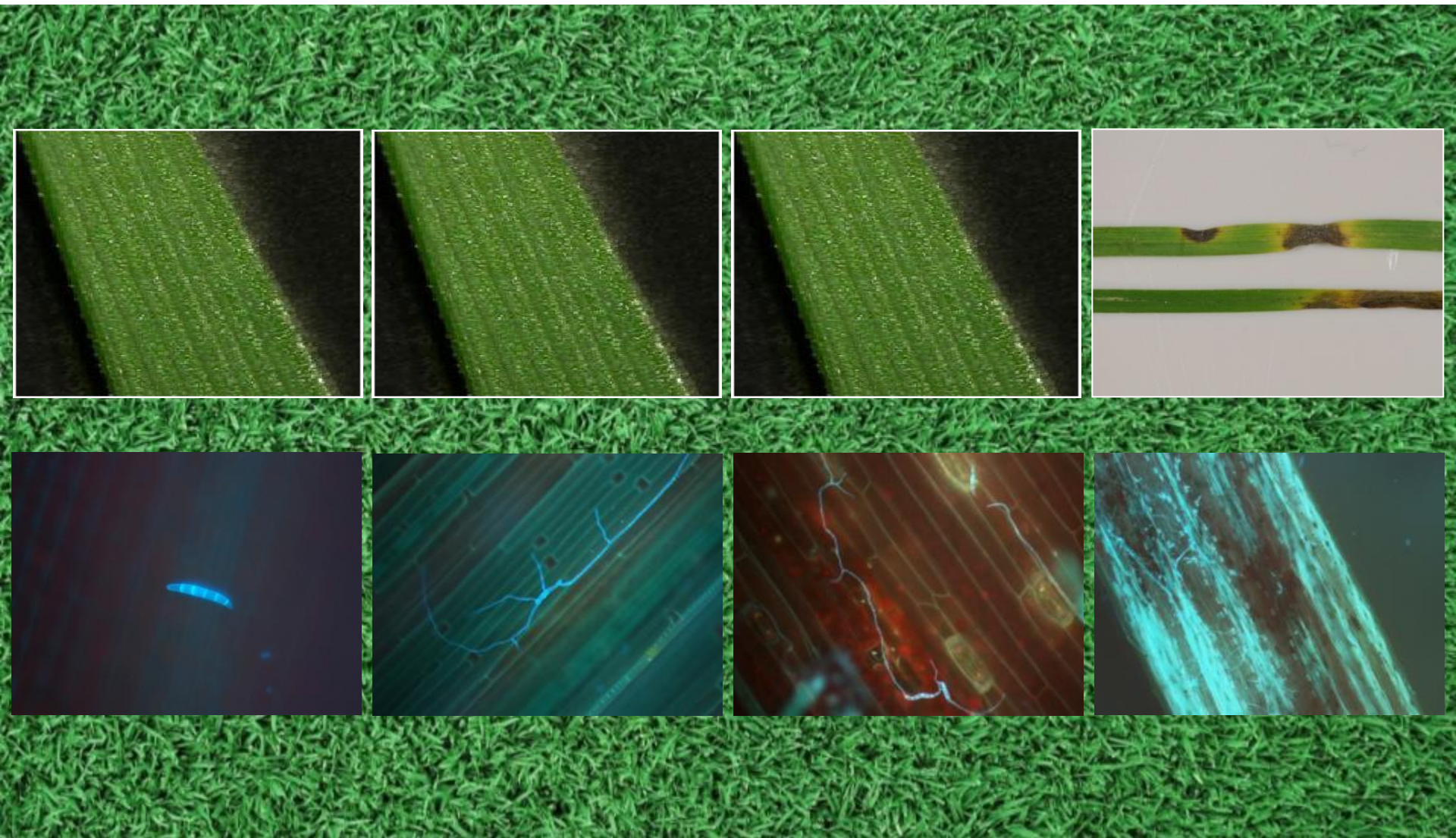
- Achieve better control
- Provide longer lasting control
- Mean less surface scarring
- Reduce the number applications
- Improve time management



Preventative applications reduce turf stress

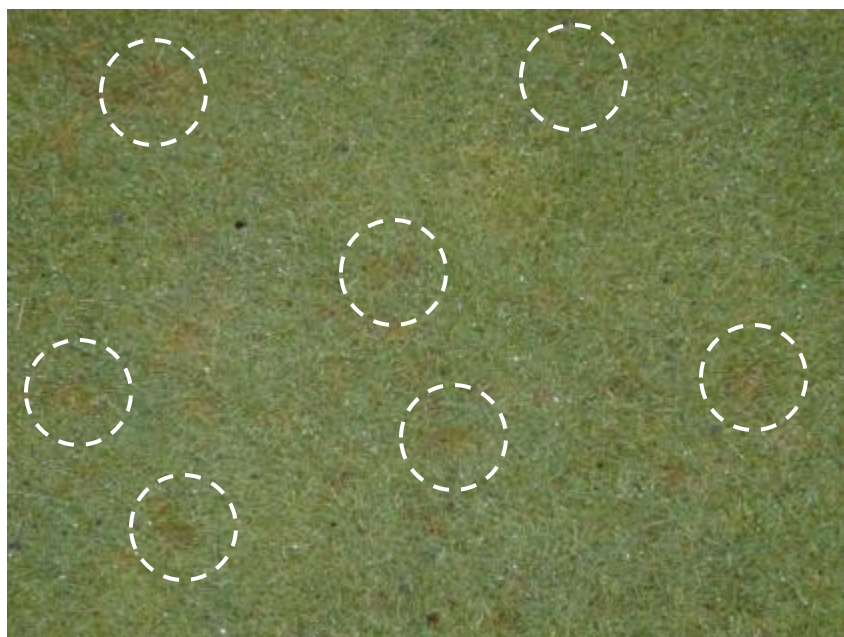


The hidden enemy



Stages of disease outbreak

Microdochium patch (*Microdochium nivale*)



1st stage Fusarium patch – small water soaked patches



2nd stage Fusarium patch – development of discoloured patches

Stages of disease outbreak

Microdochium patch (*Microdochium nivale*)

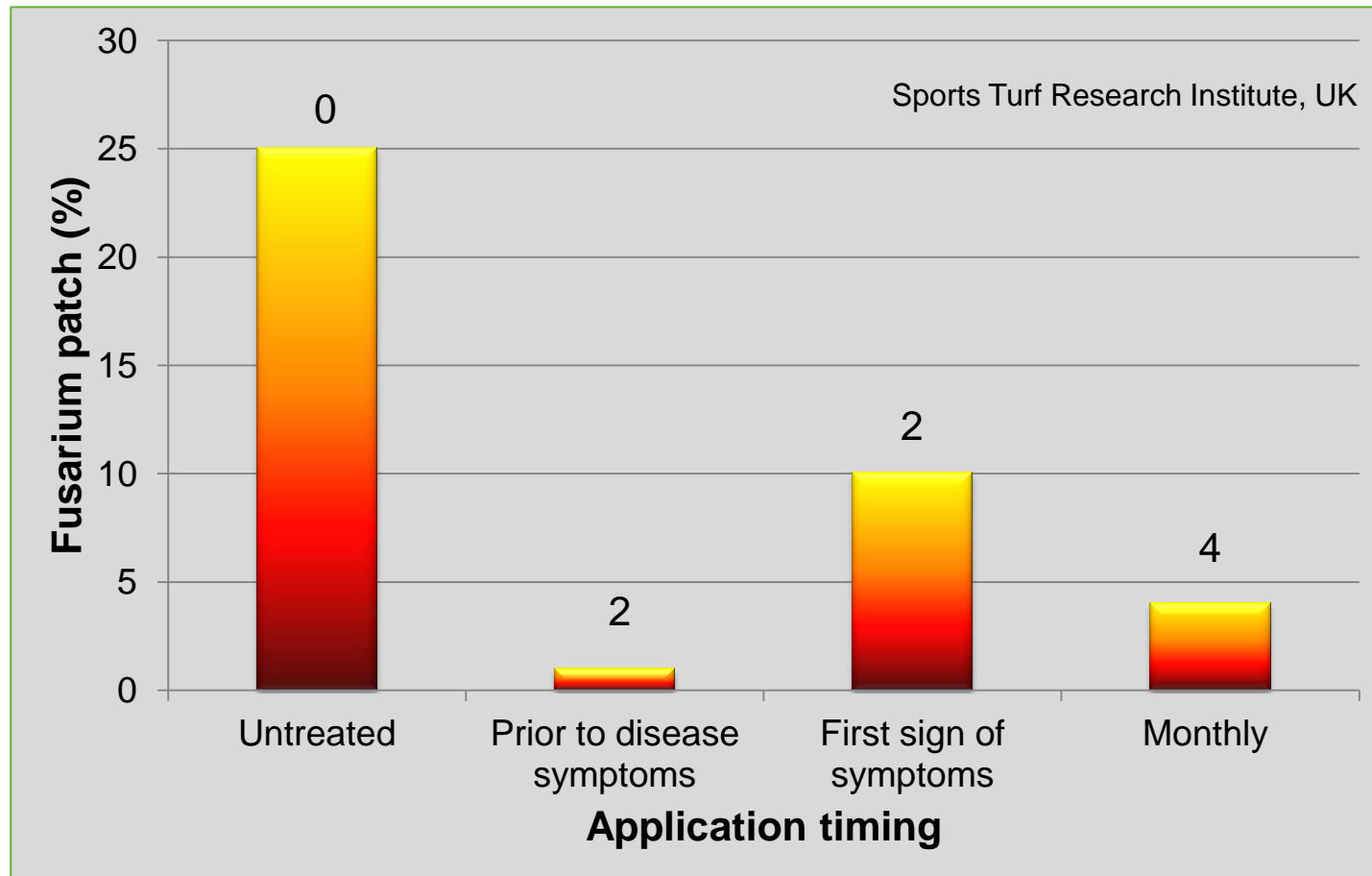


3rd stage Fusarium patch –
spreading patches in conducive
weather conditions



4th stage Fusarium patch – large
spreading patches

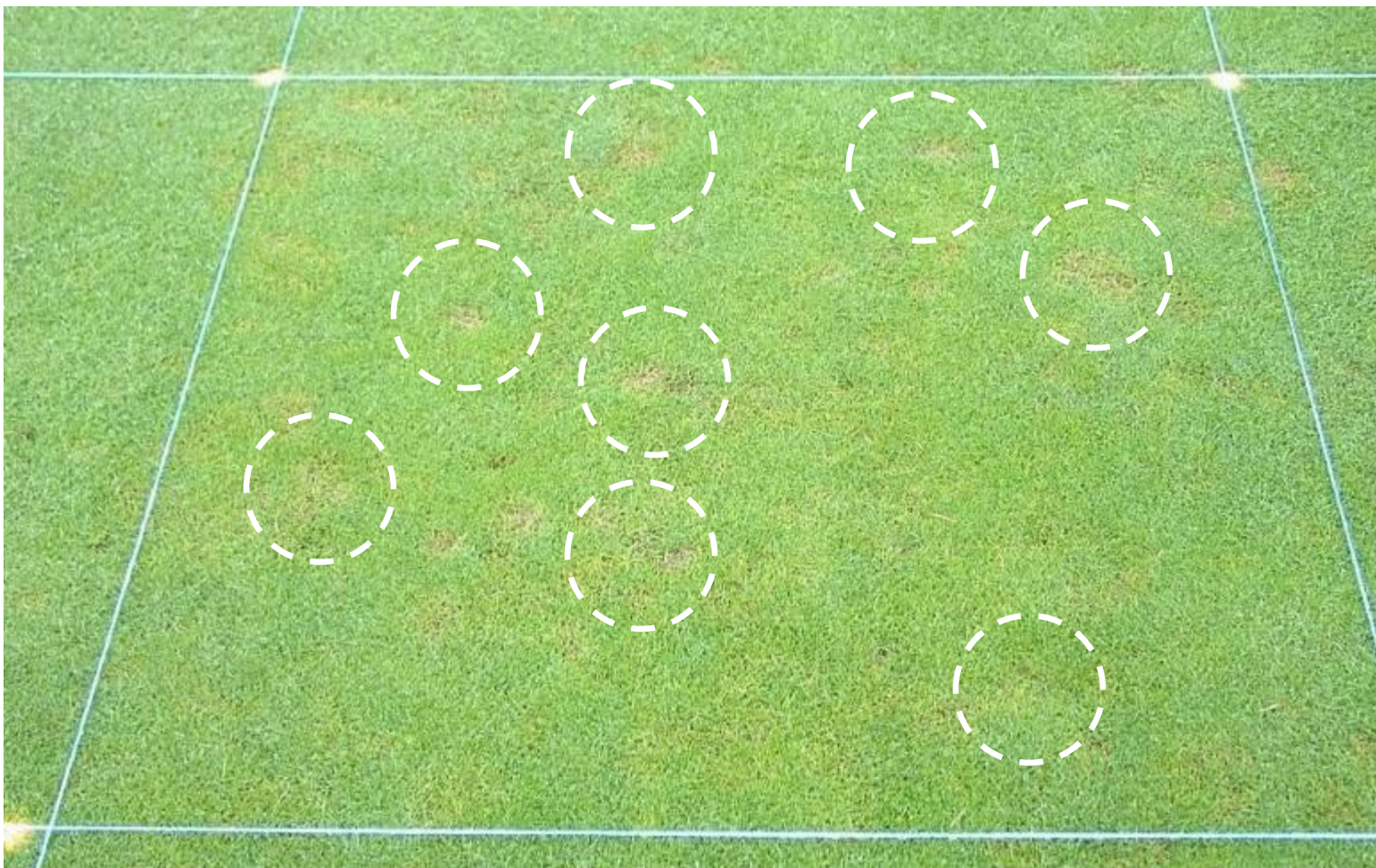
STRI trial: The power of preventative fungicide application



Note: Numbers above bars represent number of Heritage applications made. Applications were made at 28 day intervals. Applications made prior to disease symptoms were made at high disease risk as predicted by GreenCast

STRI GreenCast Trial

Untreated Plot



STRI GreenCast Trial

Heritage applied monthly
– 4 applications –



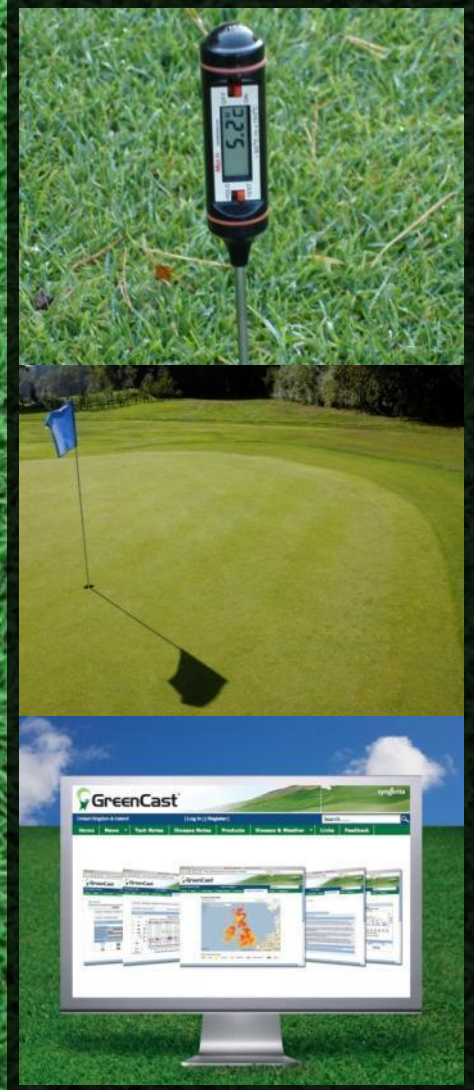
STRI GreenCast Trial

Heritage applied at high disease risk (GreenCast)
– 2 applications –



Timing fungicide application!

- **Soil temperatures:**
Soil and air temperature consistently above 8 - 10°C for 5 days or more
- **Indicator green on golf courses**
- **www.greencast.co.uk**



Disease forecasting.....

Disease Risk Index

	Friday 23/10	Saturday 24/10	Sunday 25/10	Monday 26/10	Tuesday 27/10
Anthracoze Foliar Risk					
Dollar Spot Risk					
Dollar Spot Risk (Irrigated)					
Fusarium Patch High Risk					
Fusarium Patch Risk					
Poa Annua Germination Risk					
Poa Annua Seedheads Risk					
Take All Patch Risk					
Take All Patch Risk (Irrigated)					

Legend

	No Risk		Some Risk		Medium Risk		Medium/High Risk		High Risk
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Ground Spraying

Hours of the Day:	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Friday 23/10																								
Saturday 24/10																								
Sunday 25/10																								
Monday 26/10																								
Tuesday 27/10																								

Colours Legend

Night time	Day time	
		Spraying Recommended
		Restricted Recommendation
		Not Recommended

Ground Spraying

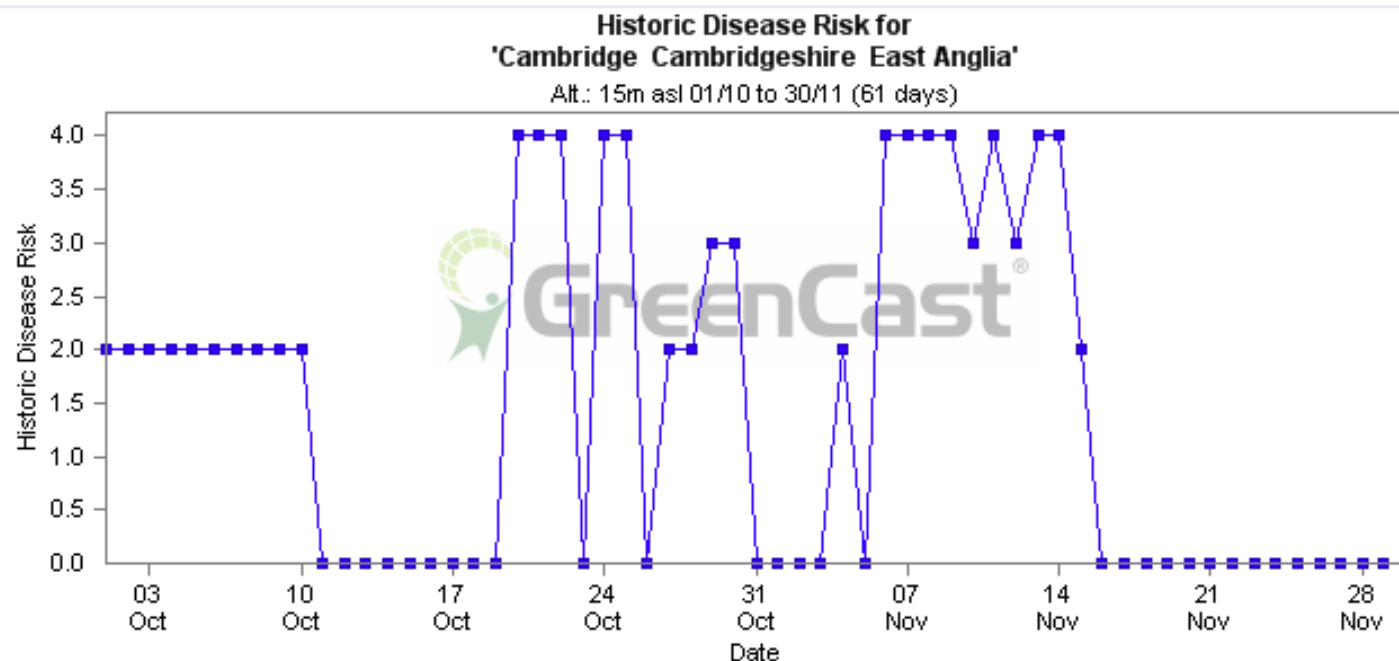
Historical data.....

Cambridge Cambridgeshire East Anglia

Start: 01/10/2010 End: 30/11/2010

[Nearby regions](#)

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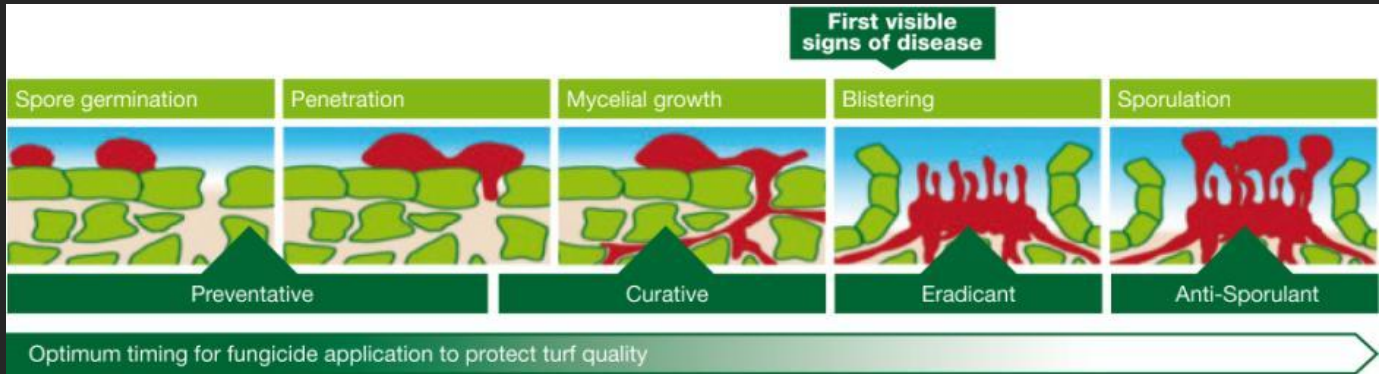
■ Fusarium Patch High Risk 2010

GreenCast is not only for disease prediction but much more...



- Product information
- Environment - Operation Pollinator
- Ground spraying conditions
- Application:
 - Nozzle selection/calibration
 - Education Podcasts
 - Record Keeping/Calculators
- Weather
- Disease notes & ITM

Effective chemistries at all stages of disease attack



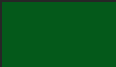
Fludioxonil



Azoxystrobin



Propiconazole

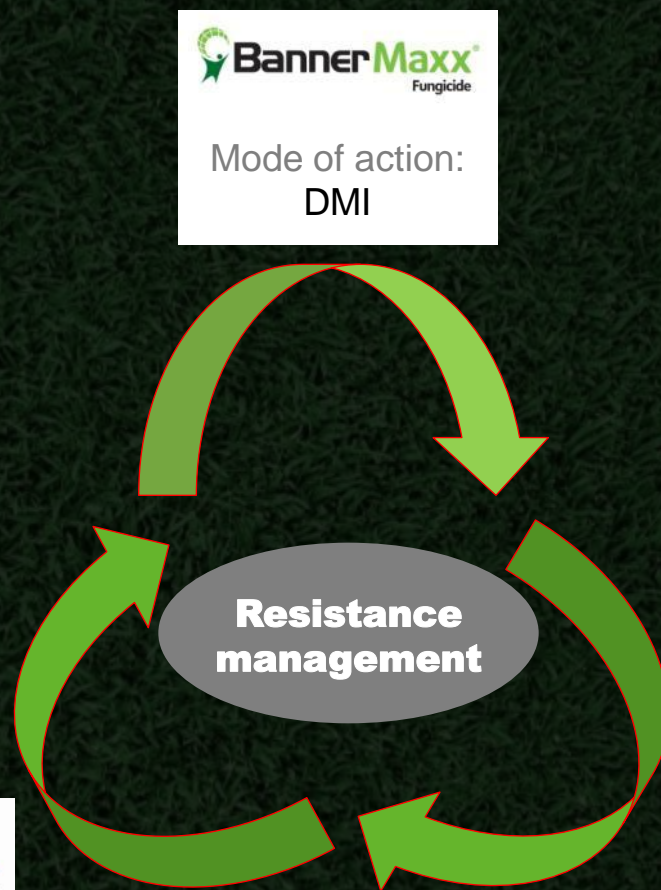


Highly effective



Lower effect

Rotate your chemistry



Mode of action:
DMI



Mode of action:
Phenylpyrrole



Mode of action:
QoI/DMI

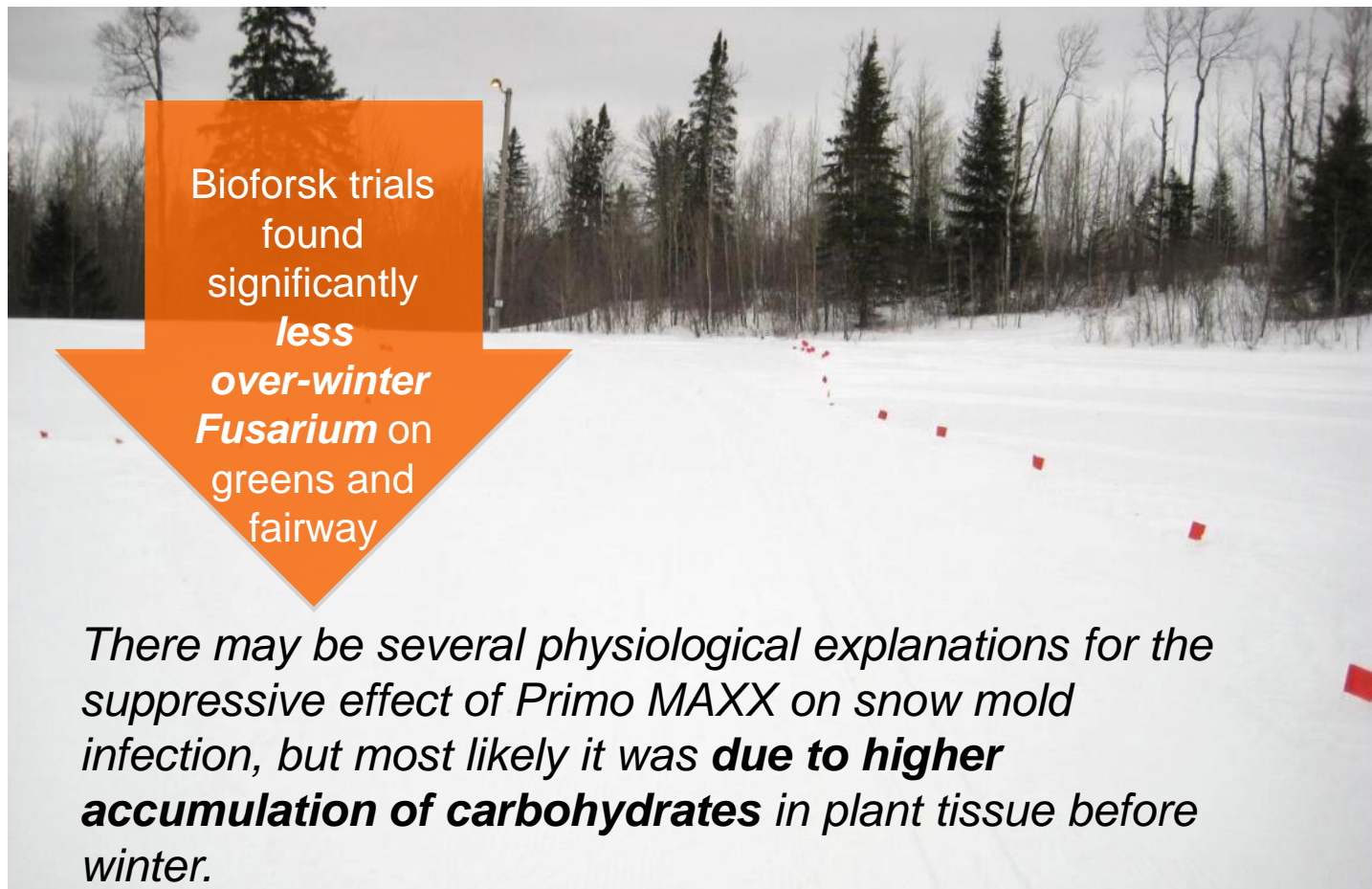
Four questions to ask for successful disease control:

1. Which disease is present/am I trying to control ?
2. At what stage of infection is the disease at ?
3. What time of year is it?
4. Which fungicide will give me best control ?

The background of the slide is a close-up, top-down view of dark brown, textured soil. Scattered across the soil are several glowing, starburst-like structures. These structures are primarily green with blue highlights, giving them a vibrant, almost ethereal appearance. They resemble microscopic organisms or perhaps the effect of a specialized light or chemical treatment on the soil. The overall lighting is dark, making the glowing elements stand out prominently.

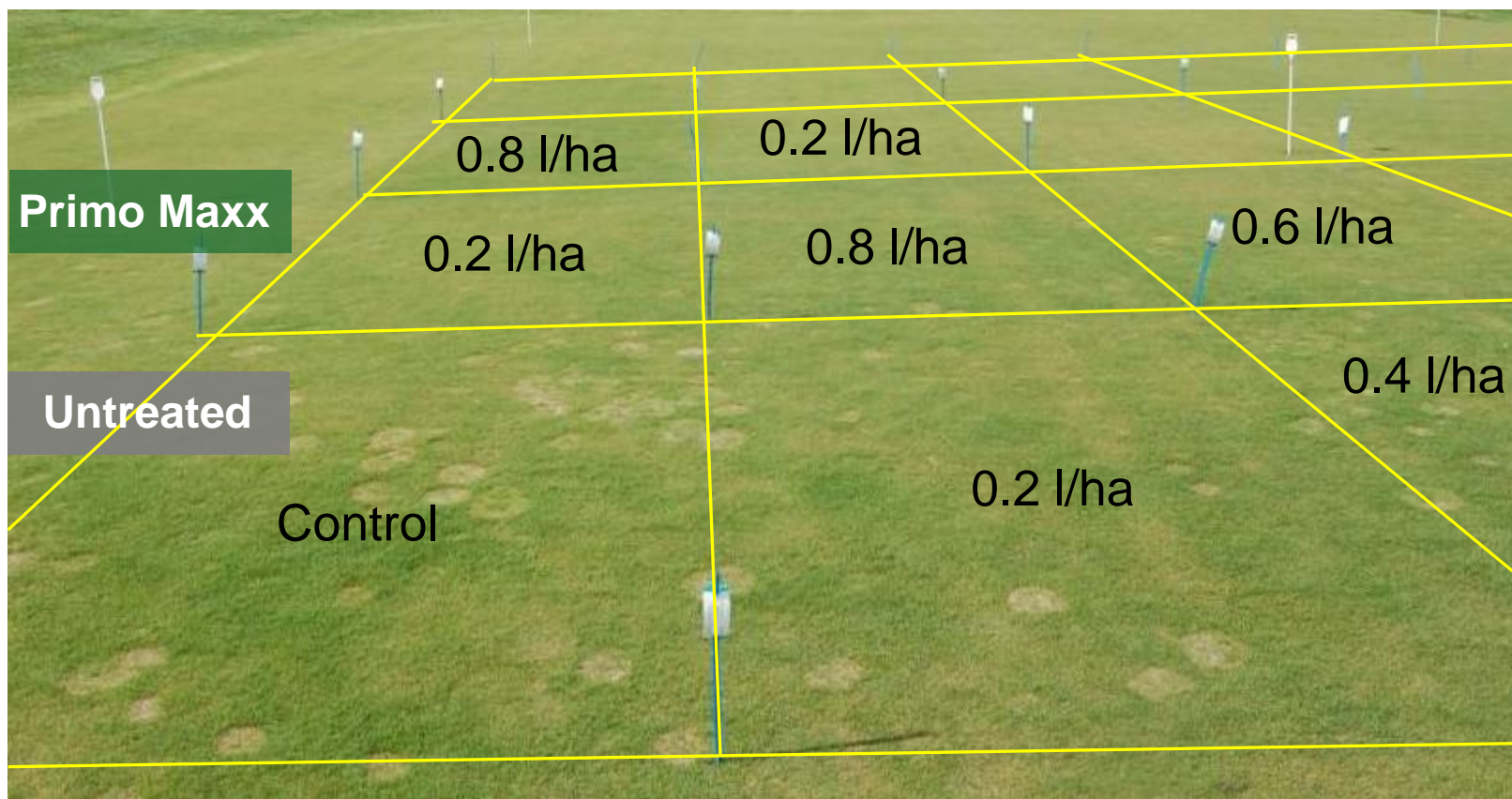
The role of Plant Growth Regulator in ITM

Primo Maxx promotes healthy turf that reduces winter disease susceptibility



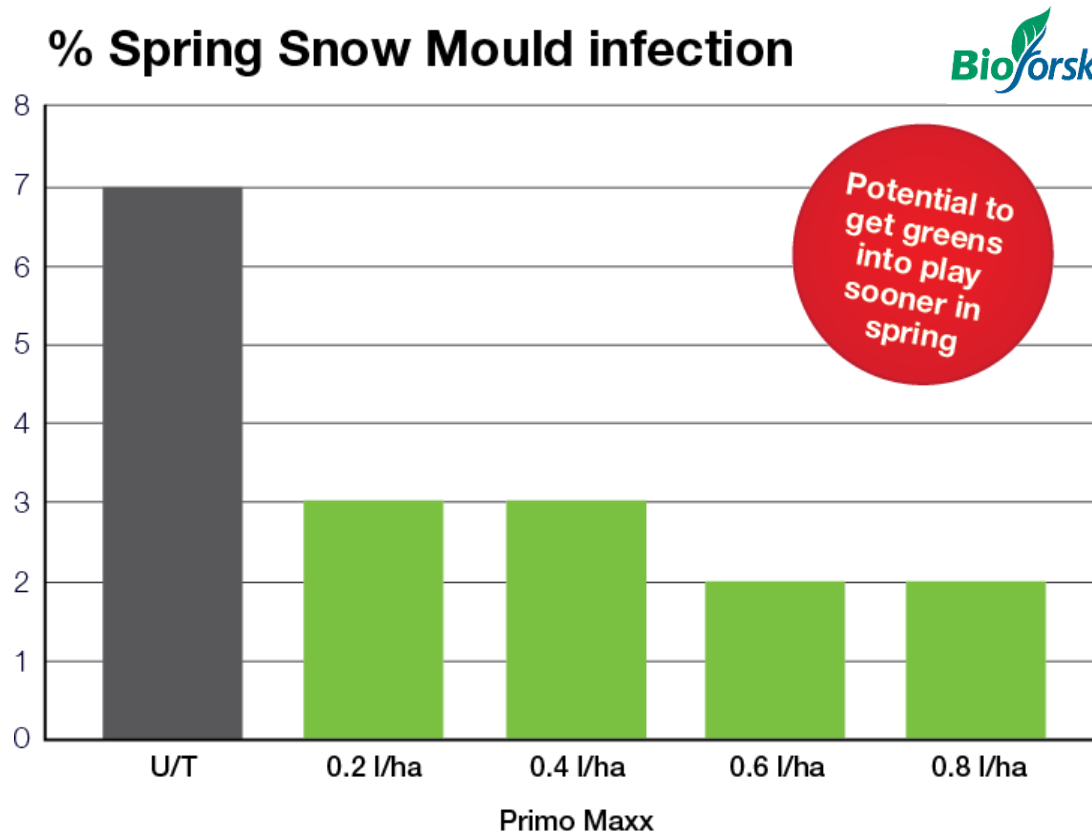
Source: Bioforsk Report 2009

Primo Maxx promotes healthy turf that reduces winter disease susceptibility



Source: Finland, Lepaa green trial, spring 2008

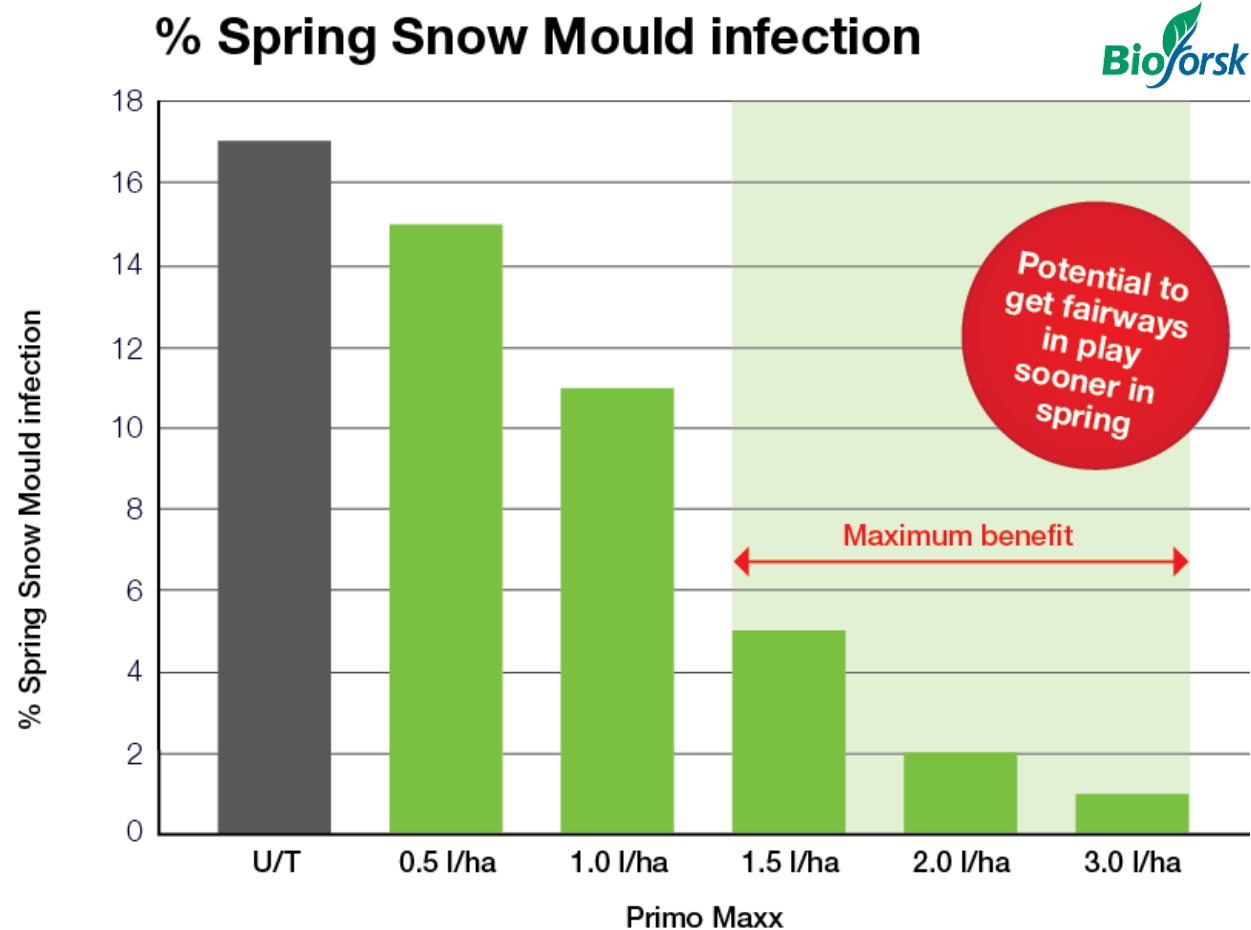
Reduced over-winter disease on greens with a Primo Maxx programme



Source : Bioforsk Lepaa, Finland Assessed 11-4-2008
Applied 6 times in previous season – last application 4-10-2007 LSD 5% = 4

syngenta

Reduced over-winter disease on fairways with a Primo Maxx programme



Source : Bioforsk Lepaa, Finland Assessed 11-4-2008
Applied 6 times in previous season – last application 4-10-2007 LSD 5% = 5

syngenta



ITM Research

Species conversion Trial – STRI UK 2009 - 2010

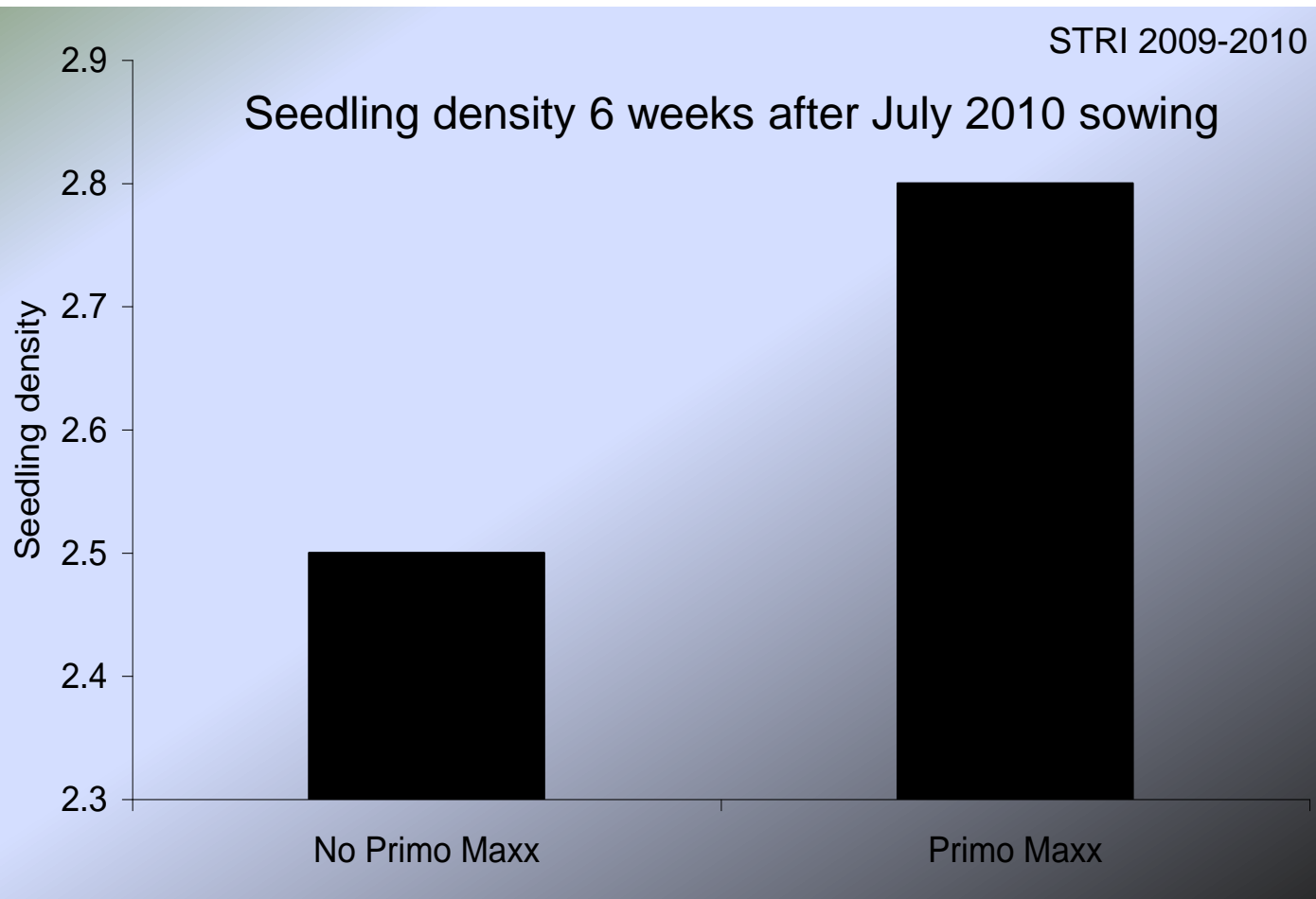
Aim

To determine the potential of an integrated approach to:

- Reduce subsurface organic matter
- Improved playing quality
 - Smoothness
 - Moisture content
 - Firmness
- Establishing seedlings
- Change sward species composition

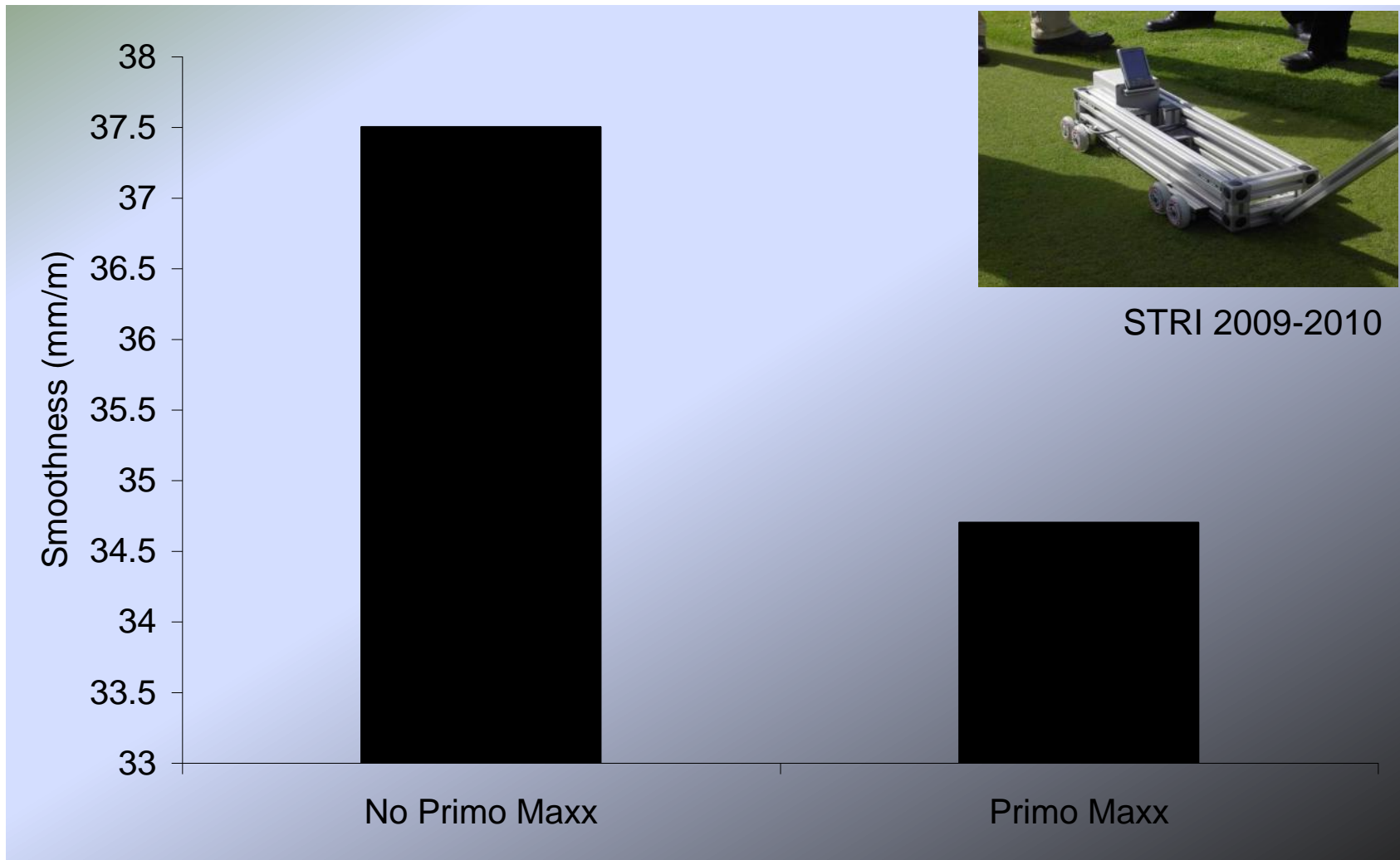


Improved seedling density with Primo Maxx

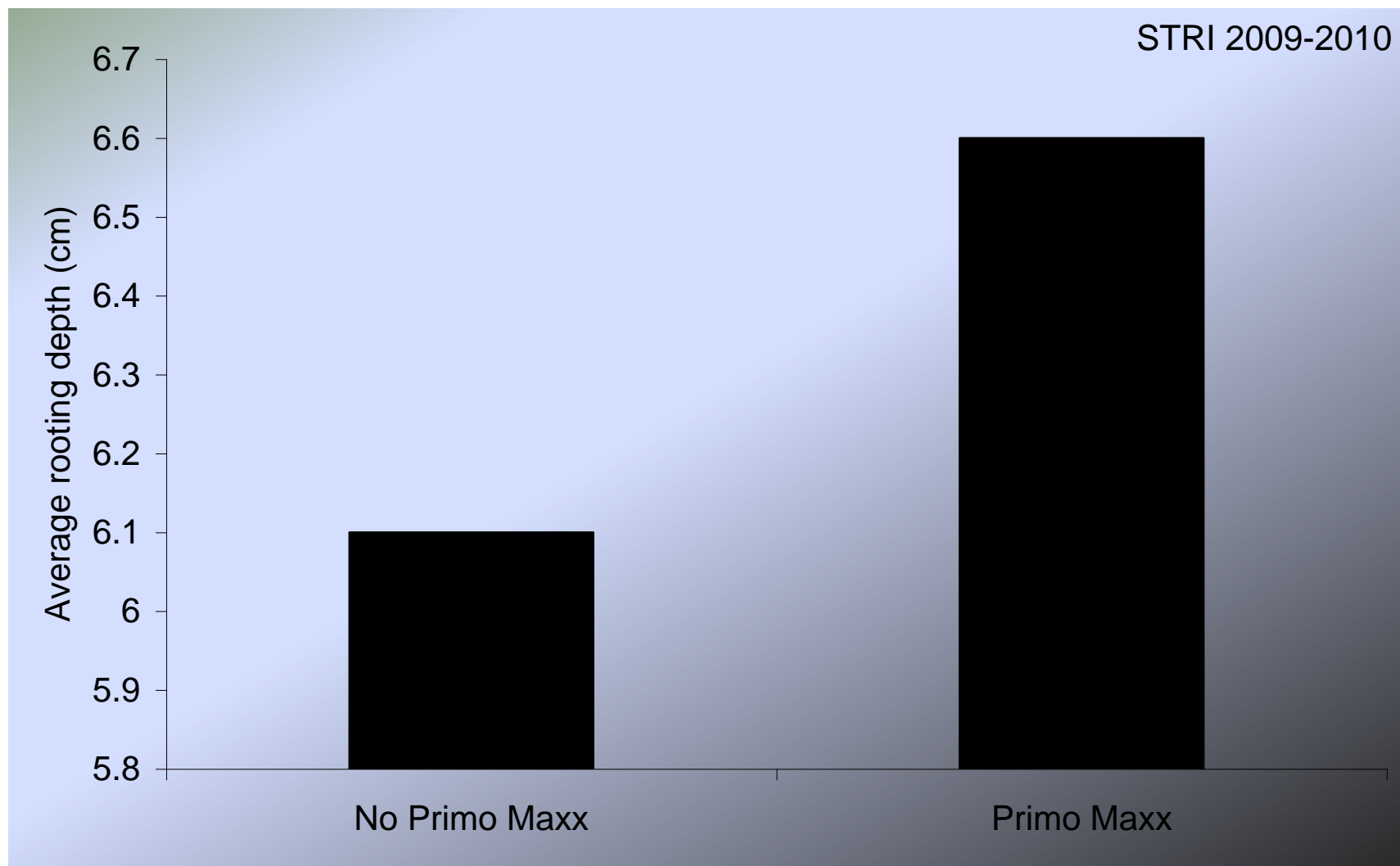


Playability improved.....

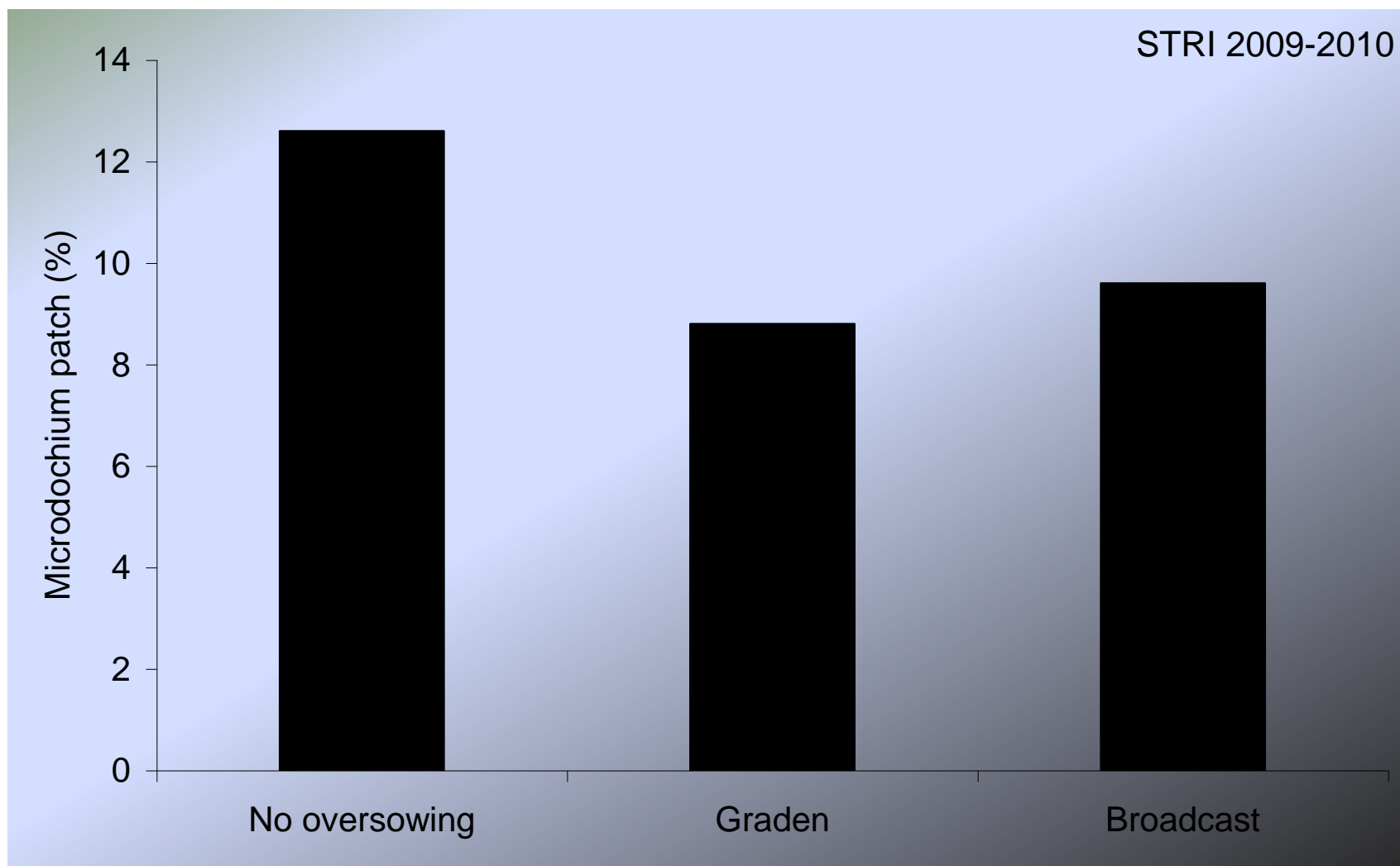
Smoothness 10 July - 7 days after aeration and oversowing treatments



Average rooting depth Oct 10



Microdochium patch August 2010



Improved surface after just two seasons.....

- **Organic matter reduced by 67%**

- Graden exchange d OM more quickly
- No increase in recovery time by double pass with scarifier

- **Using Primo Maxx**

- Increased seedling establishment
- Increase surface smoothness
- Improved turf colour
- Increased average root depth

- **Over-seeding prevented *Poa* ingress**

- Seeding attachment improved establishment

Improved playability

Firmer, drier and smoother surface

Improved botanical composition

Less disease



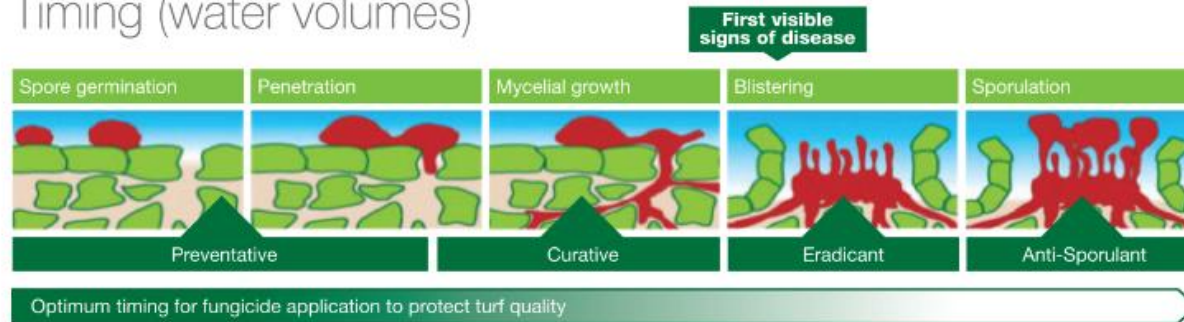
Art of Application

Calibrate | Spray | Report | Deliver

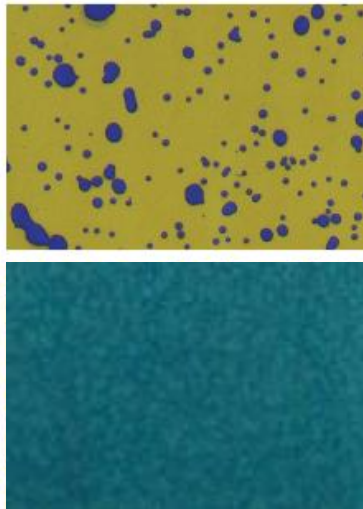


Application – where do we have issues?

Timing (water volumes)



Coverage/Target



Drift



Accuracy



The importance of stewardship?

- Responsible use of plant protection products
- Maximising efficacy of plant protection products
- Minimising loss to environmental
- Retention of active ingredients
- **Enable & Promote Best Practice !**



Syngenta Foliar nozzle – Air inclusion nozzle



Recommended for:

- All foliar **Fungicide** application
- **Primo Maxx** growth regulator application



Excellent coverage and superior penetration of thatch

Standard flat fan nozzle



Turf foliar nozzle



Reduced drift !

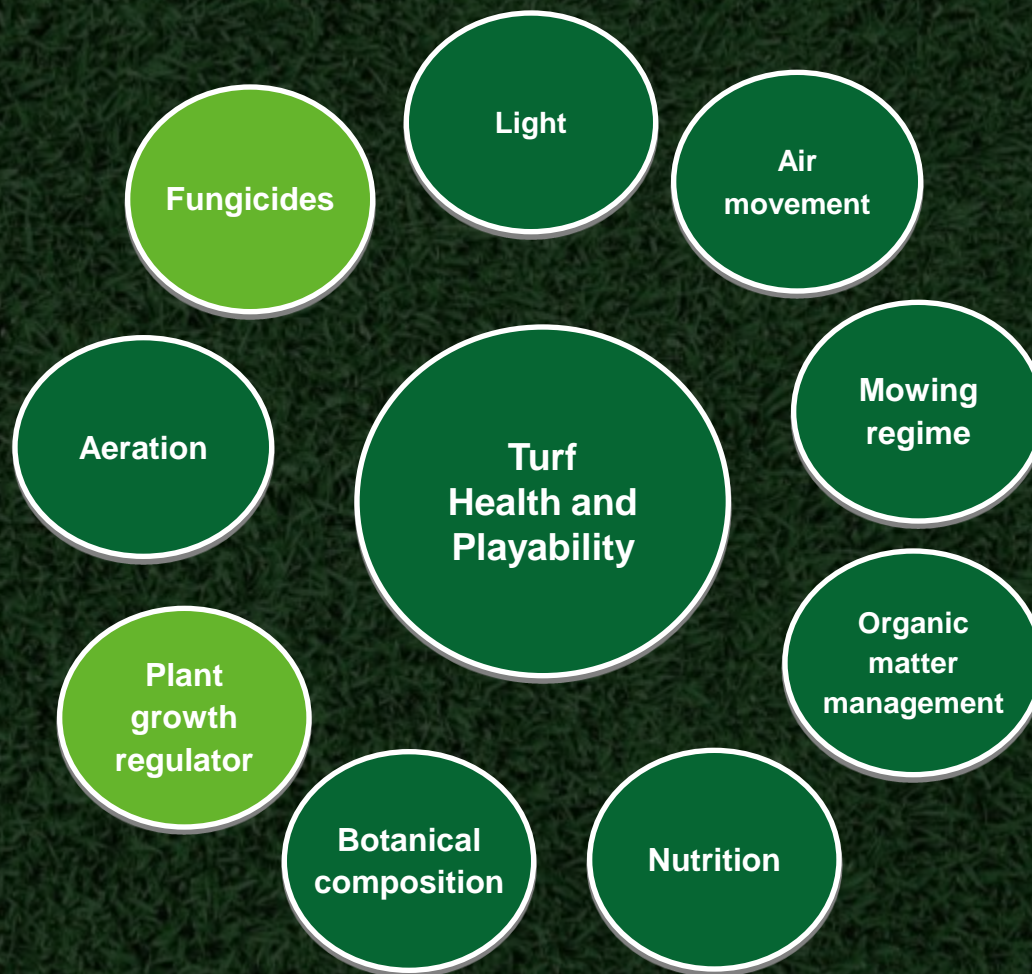
Conventional
Flat Fan nozzle



Syngenta
Foliar Turf Nozzle



Integrated Turf Management





**Thank
You!**

