Primo Maxx Application on Warm-season Turfgrasses

syngenta®

Sowmya (Shoumo) Mitra, Ph.D.
Head Turf, Landscape & Ornamentals, APAC, L&G

™

Speaker: Sowmya (Shoumo) Mitra, Ph.D.
APAC Head of Turf, Landscape & Ornmentals
Syngenta Asia Pacific Pte. Ltd.

Education
Univ. of Massachusetts, U.S.A.

Prior Job
Professor
California State Univ., Pomona, U.S.A.

Global HQ
Basel, Switzerland

Syngenta Asia Pacifc Regional HQ
Singapore

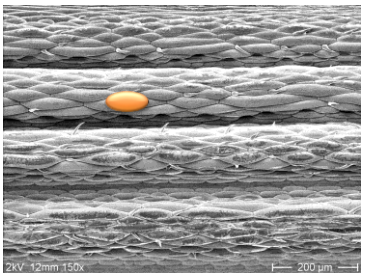
Primo MAXX - What is it?

- Plant growth regulator
- Designed specially for turf
- Active Ingredient: Trinexapac-ethyl
- Concentration: 121g/l
- Formulation Type: Micro-emulsifiable concentrate
- Properties: Primo Maxx is a transparent liquid that forms a micro-emulsion upon dilution in water
- Late GA Synthesis Blockers

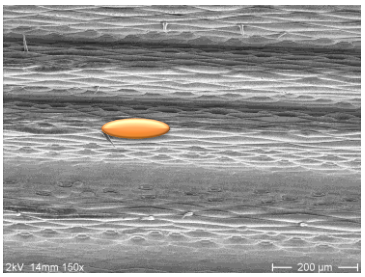
How Does Primo Maxx Work?

- Gibberellic Acid (G.A.) is a growth hormone primarily responsible for cell elongation

- Primo Maxx blocks G.A. production late in the G.A. cycle



Primo



Untreated

- Vertical growth is reduced

- Grass continues to grow at same rate BUT energy is diverted to produce more lateral growth and rooting

syngenta®

Some Primo Maxx Concepts

GOING INTO REGULATION

- The product enters the plant system
- GA starts to be inhibited
- The plant starts showing physiological and morphological visible changes after 2nd or 3rd application

SPEED OF REGULATION

- Once the vertical growth is regulated horizontal growth is promoted
- Increase in green speed

BOUNCE BACK or RE-BOUND EFFECT

- Plant response may lead to growth after post growth suppression.

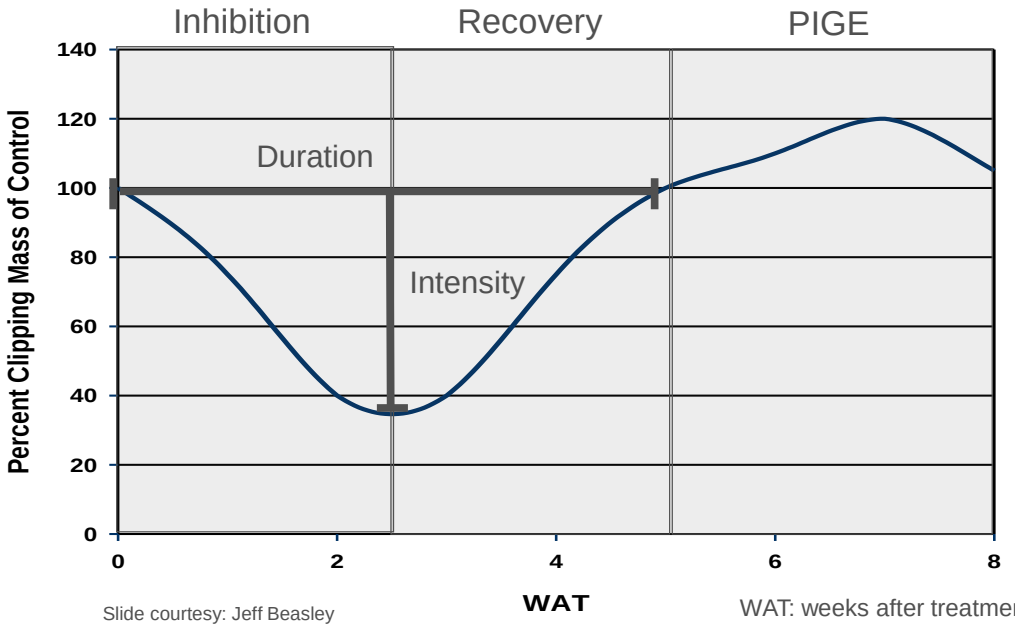
syngenta®

1

Seasonal Fluctuations in the Half-Life of Primo Maxx in Turfgrasses

syngenta®

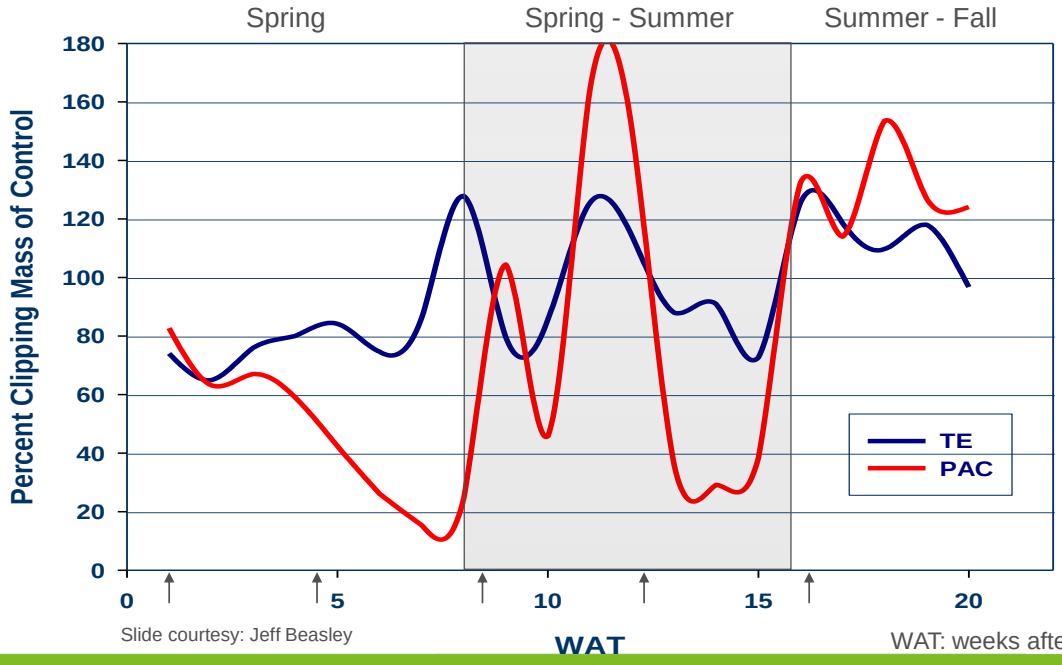
Typical Turfgrass Response to PGRs



Slide courtesy: Jeff Beasley

WAT: weeks after treatment

Season Fluctuation With Sequential PGR Applications



Slide courtesy: Jeff Beasley

WAT: weeks after treatment

syngenta®

Half-Life of Primo Maxx is much shorter under high temperatures

Half-lives of Primo and Trimmit

Treatment & species	Growth chambers		Field	
	64.4 F (18 C)	86 F (30 C)	Spring	Summer
Primo Maxx	Half-life (days)			
Kentucky bluegrass	5.3	3.4	5.8	4.2
Creeping bentgrass	6.4	3.1		
Trimmit 2SC				
Kentucky bluegrass	11-15	7-9	15.4	11.5
Creeping bentgrass	9-11	6-8		

Golf Course Management: July 2007

syngenta®

Leaf Area and Canopy Density

Slide courtesy: Jeff Beasley

Primo Maxx does not significantly change leaf index

PGRs vs. leaf area indices

	Leaf-area indices — spring 2004		
WAT	Primo Maxx	Trimmit 2SC	Control
1	1.53*	1.47*	1.72
2	1.72	1.36*	1.63
3	1.81	1.71	1.82
4	1.87	1.81	1.73
5	2.06	2.17*	1.91
6	2.12	2.22	2.11
7	2.21	2.29	2.16
8	2.42	2.69	2.36

Abbreviation: WAT, weeks after treatment.
*The PGR treatment is significantly different from the control.

Golf Course Management: July 2007

2

Effect of Primo Maxx on Root Growth

How Do PGRs affect root growth?

Slide courtesy: Jeff Beasley

Primo Maxx Promotes Tillering

Primo vs. Kentucky bluegrass

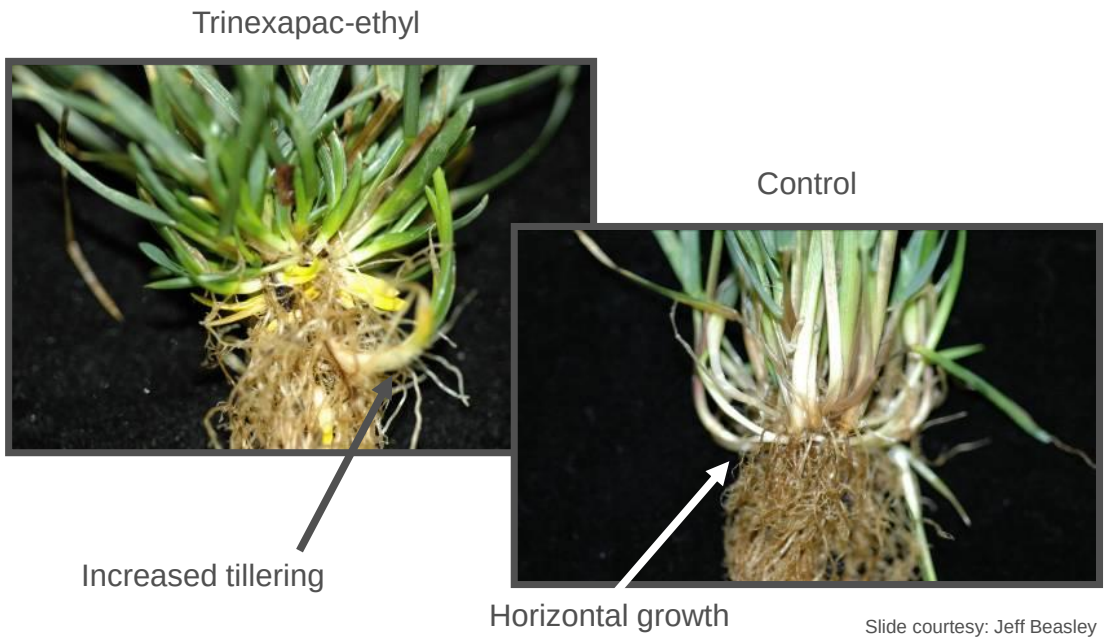
Weeks after treatment	Plant height as % of control	Tiller number		
		Primo Maxx	Control	Statistical significance
1	46	3.0	3.0	NS
2	41	4.8	8.8	*
3	57	8.3	6.3	NS
4	119	12.3	10.3	*
5	129	17.0	10.3	*
6	137	15.5	11.3	*
7	94	19.8	15.0	*

*The Primo Maxx treatment is significantly different from the control. NS, not significant.

Golf Course Management: July 2007

syngenta®

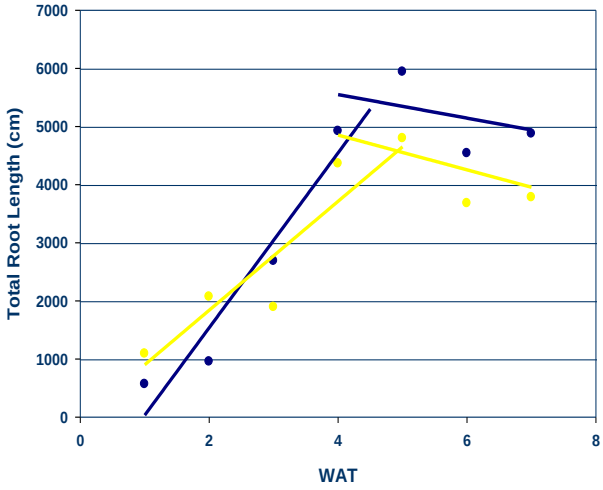
Trinexapac-ethyl Effects on Plant Growth – 3 WAT



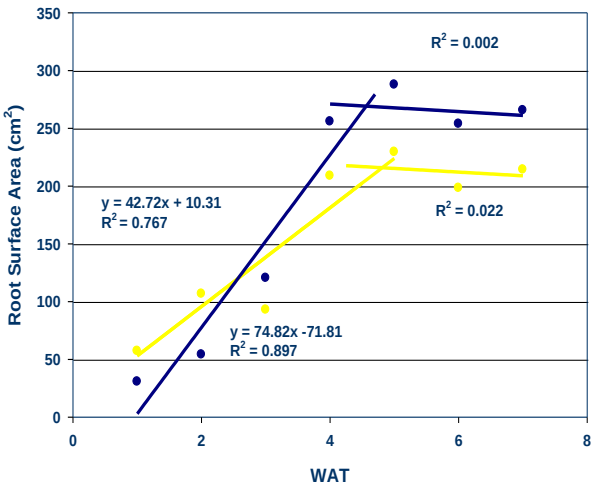
Slide courtesy: Jeff Beasley

Trinexapac-ethyl increases root length and root surface area

Total Root Length



Root Surface Area

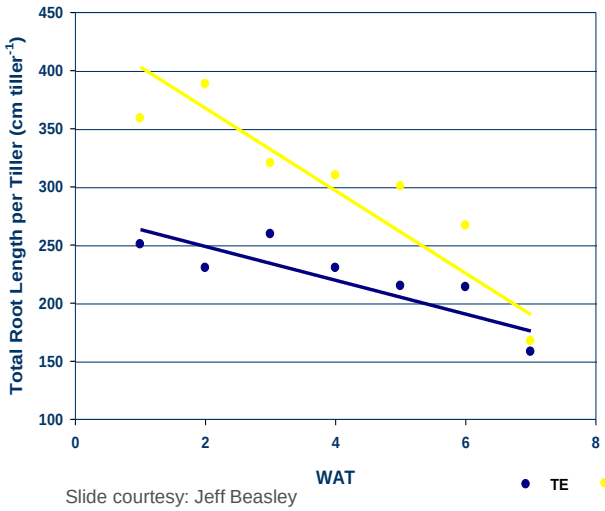


Slide courtesy: Jeff Beasley

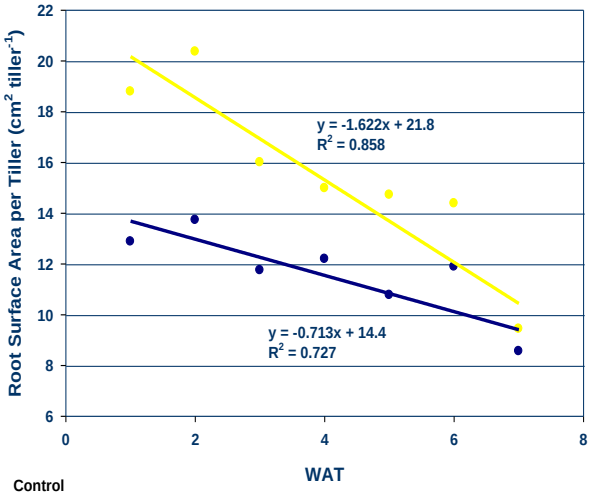
TE Control

Trinexapac-ethyl increases root length and root surface area per tiller

Total Root Length per Tiller



Root Surface Area per Tiller



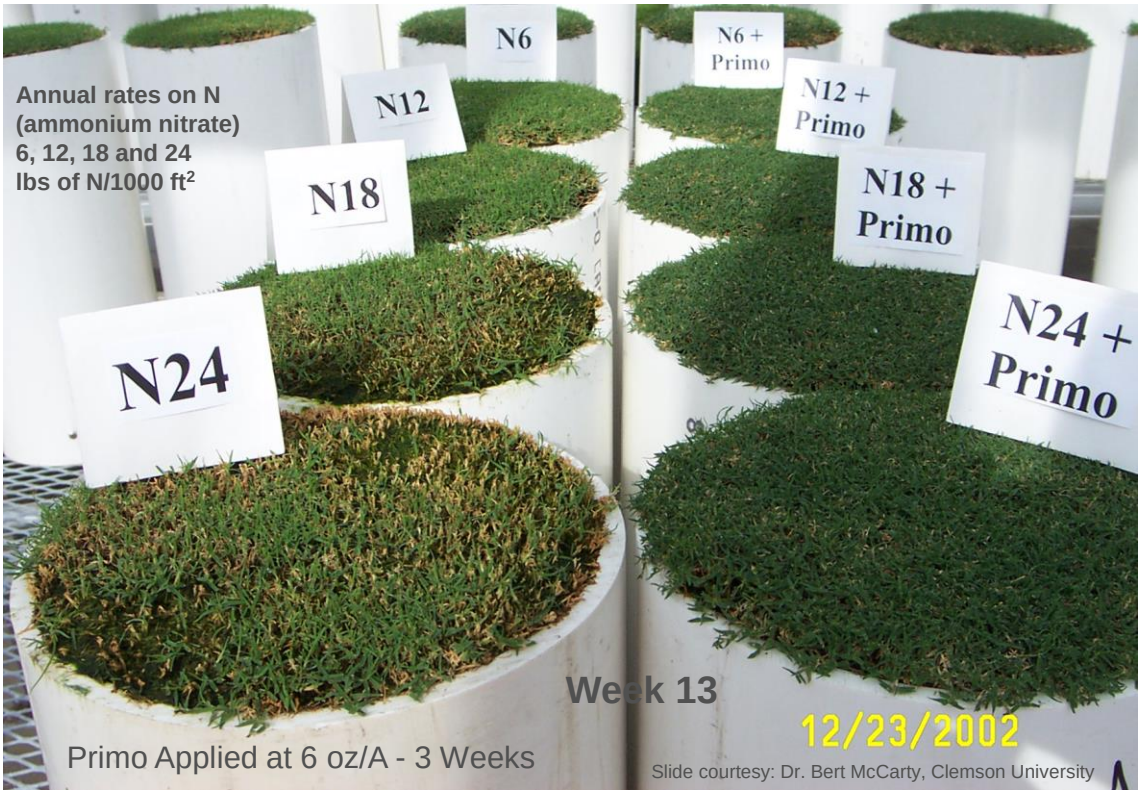
TE Control

Slide courtesy: Jeff Beasley

Primo MAXX Increases Roots in Bermudagrass

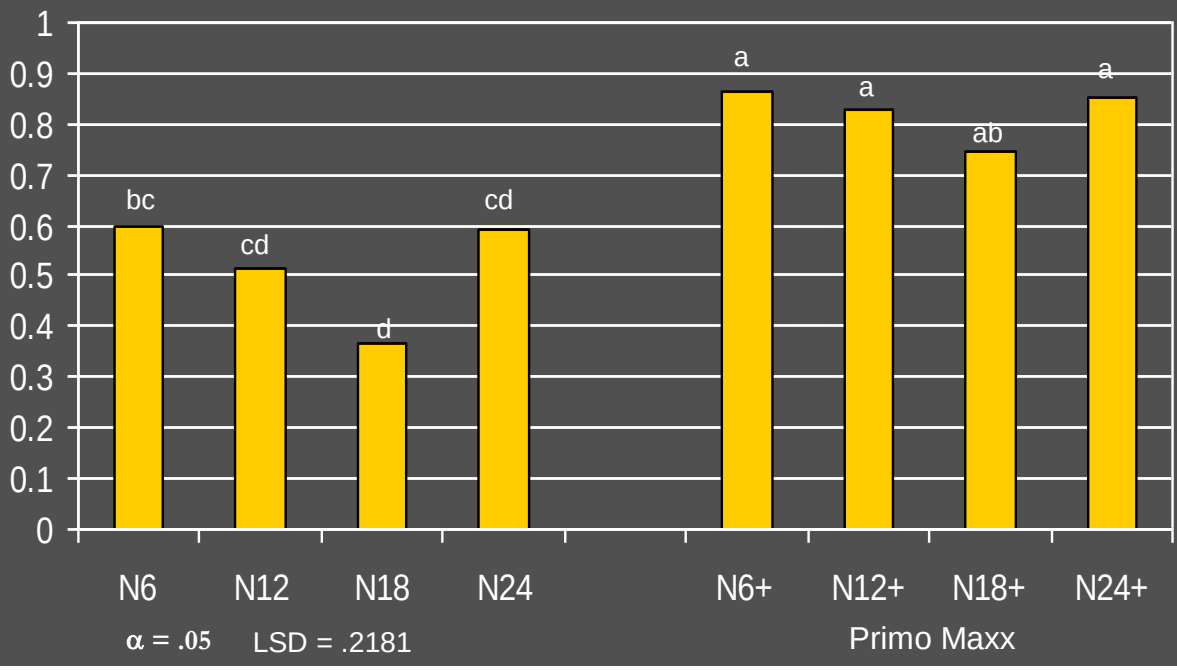
- Turf under Primo MAXX regulation continues to carry on normal plant processes of growth and development (photosynthesis and respiration)
- As vertical foliar growth slows, energy is redirected to lateral stems and below ground plant parts
- Lateral stems and root-mass increase after repeat applications

Root frame used to evaluate rooting by measuring force required to pull the frame



Primo Maxx applications increased total root biomass

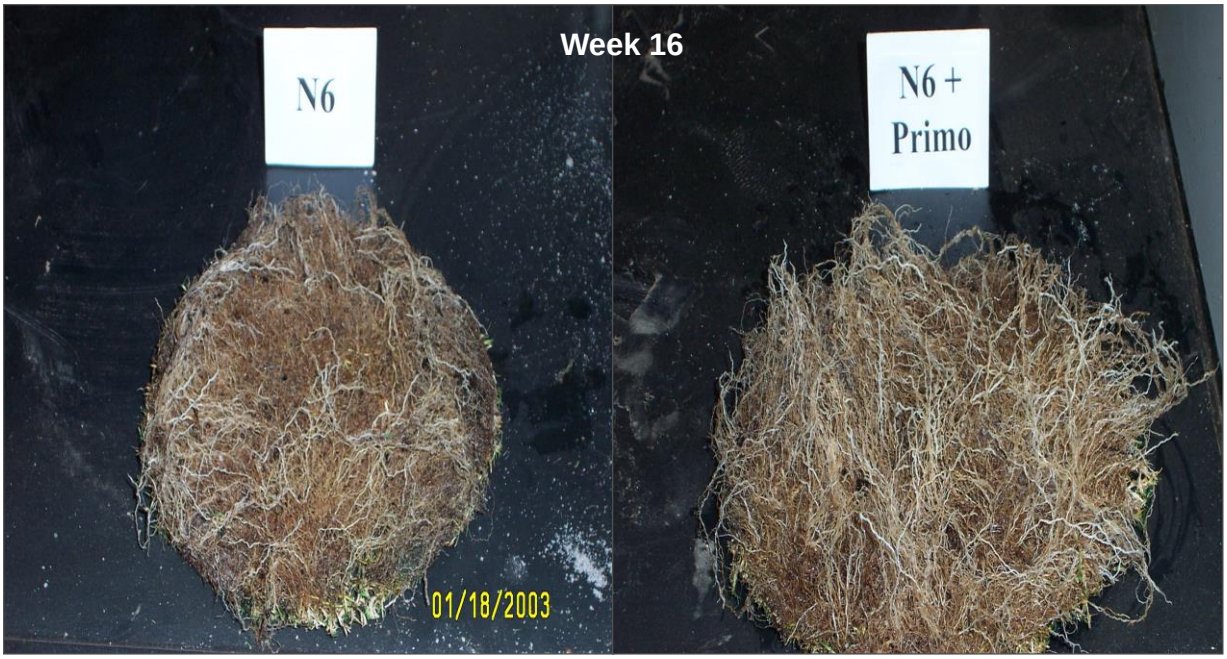
Slide courtesy: Dr. Bert McCarty, Clemson University



syngenta®

Primo Maxx application increase root biomass of bermudgrass /8.125 lbs N/1000 sq ft per week)

Slide courtesy: Dr. Bert McCarty, Clemson University



syngenta®

Greenhouse Study

16 Weeks After Initial Treatment

Untreated

Primo Maxx

0.48 Litres/Ha

Slide courtesy: Dr. Bert McCarty, Clemson University

syngenta®

Summary

PGR efficacy is reduced with warmer temperatures

- Application rates
- Metabolism, environmental factors, and plant growth

Affect of PGR efficacy on canopy dynamics.

- Spring vs. Summer

Root Growth

- Tiller growth was the greatest energy sink

When is the Best Time to Apply Primo Maxx on Turf under Warmer Conditions?

During warmer summer temperatures (above 30˚C) shorten the interval between sequential PGR applications

3

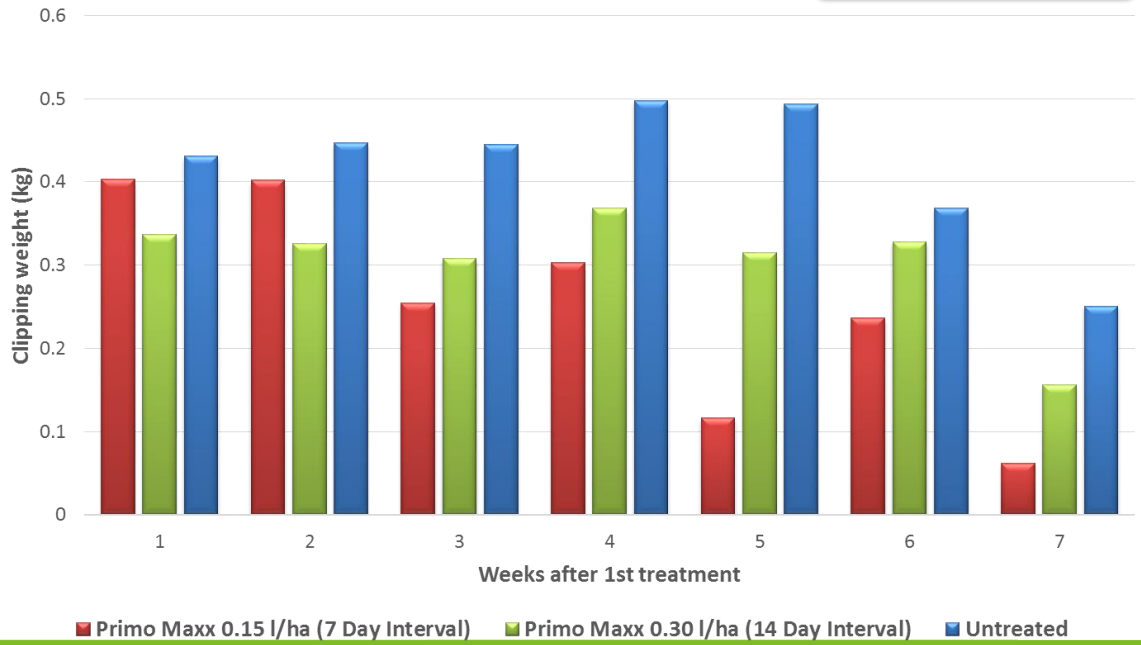
Case Study: Field Trials conducted at Riverside Golf Club, Indonesia

syngenta®

Primo Maxx on greens

Best results low rates more frequently

Riverside Golf Club 2016
Green – Tifdwarf Bermudagrass



syngenta®

The ‘Primo effect’ on bermudagrass green 7 weeks after 1st treatment

Untreated

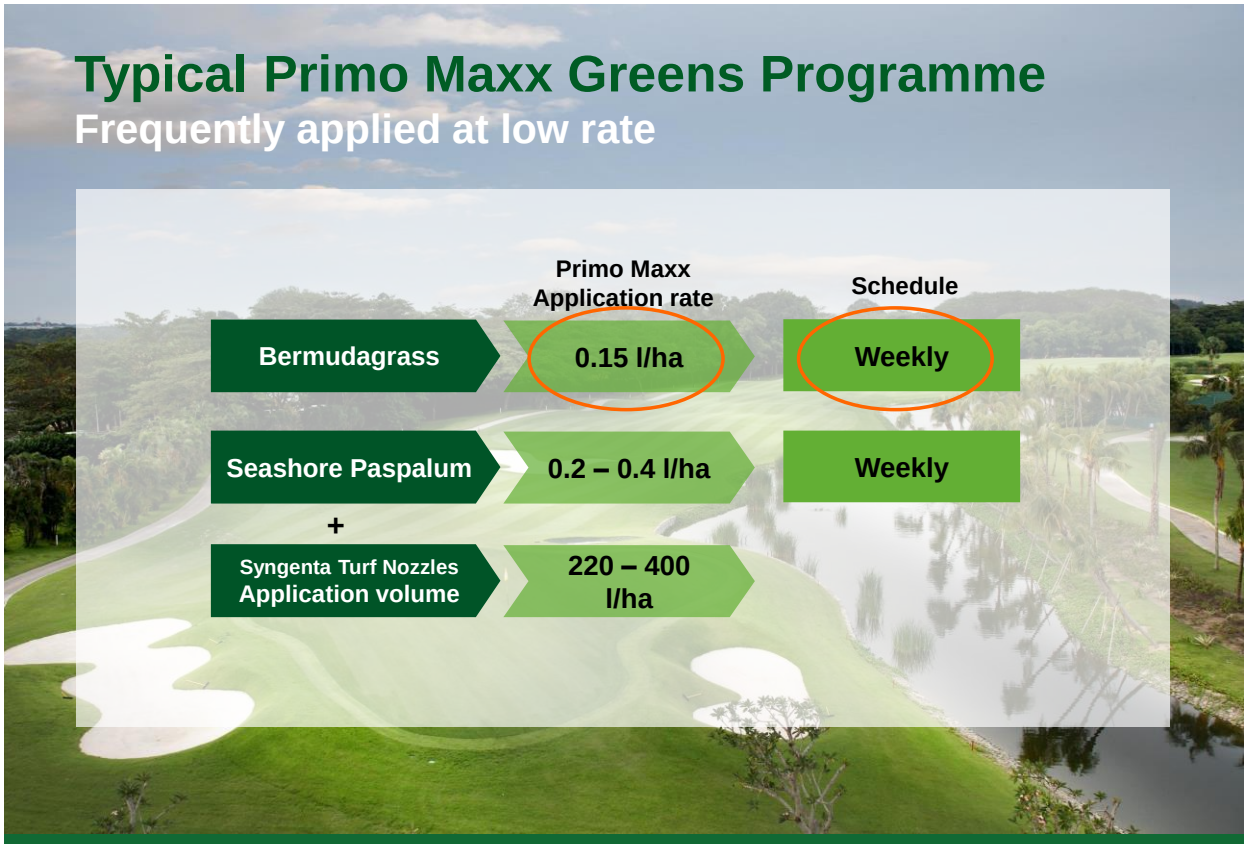
Primo Maxx 0.3 l/ha every 14 days

Primo Maxx 0.15 l/ha every 7 days

syngenta®

Typical Primo Maxx Greens Programme

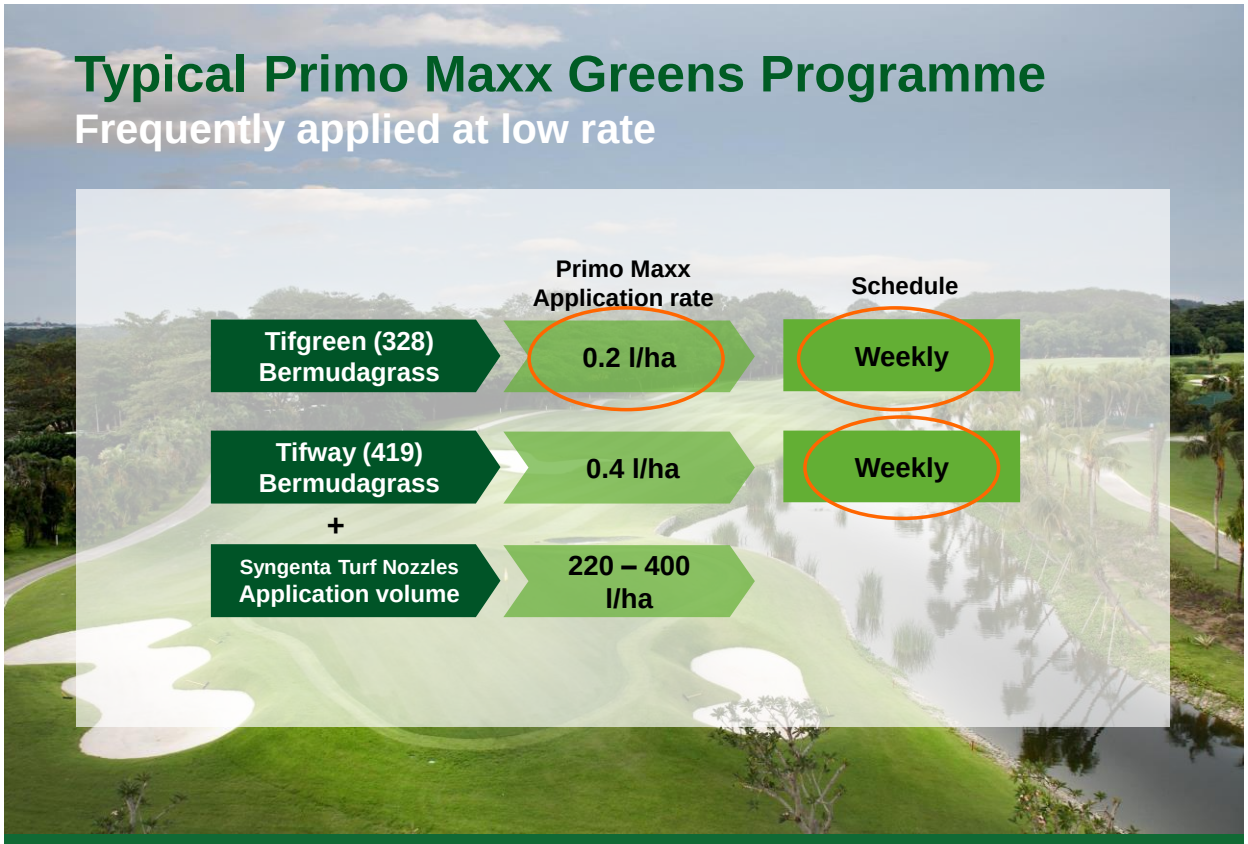
Frequently applied at low rate



syngenta®

Typical Primo Maxx Greens Programme

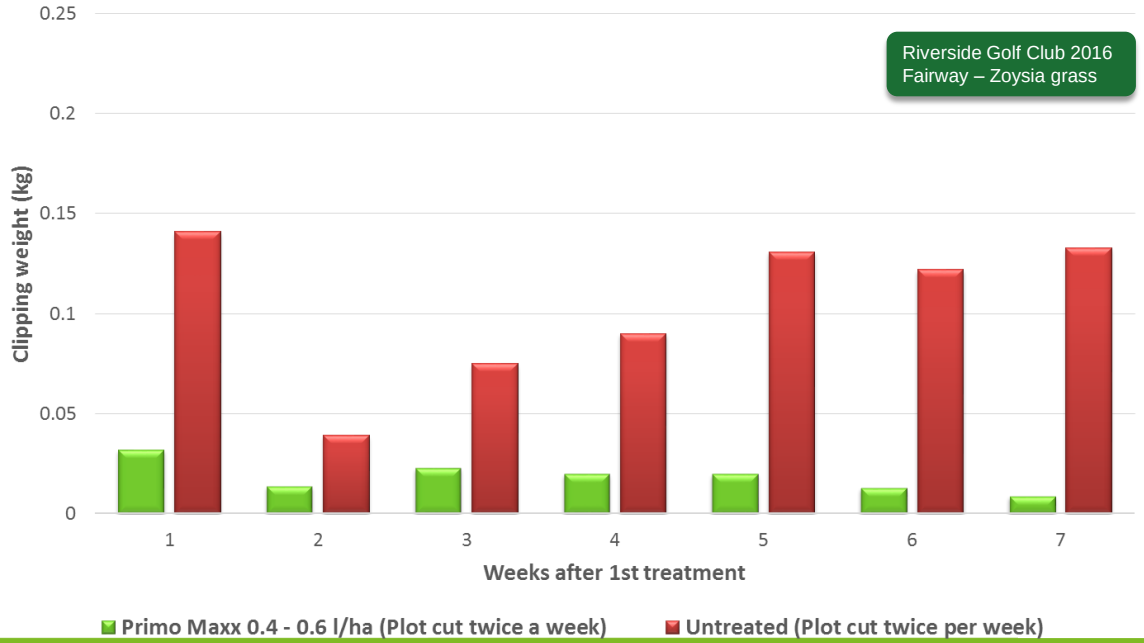
Frequently applied at low rate



syngenta®

Primo Maxx on fairways

Clippings reduced by 60 - 90% on Zoysia fairway under a typical mowing regime



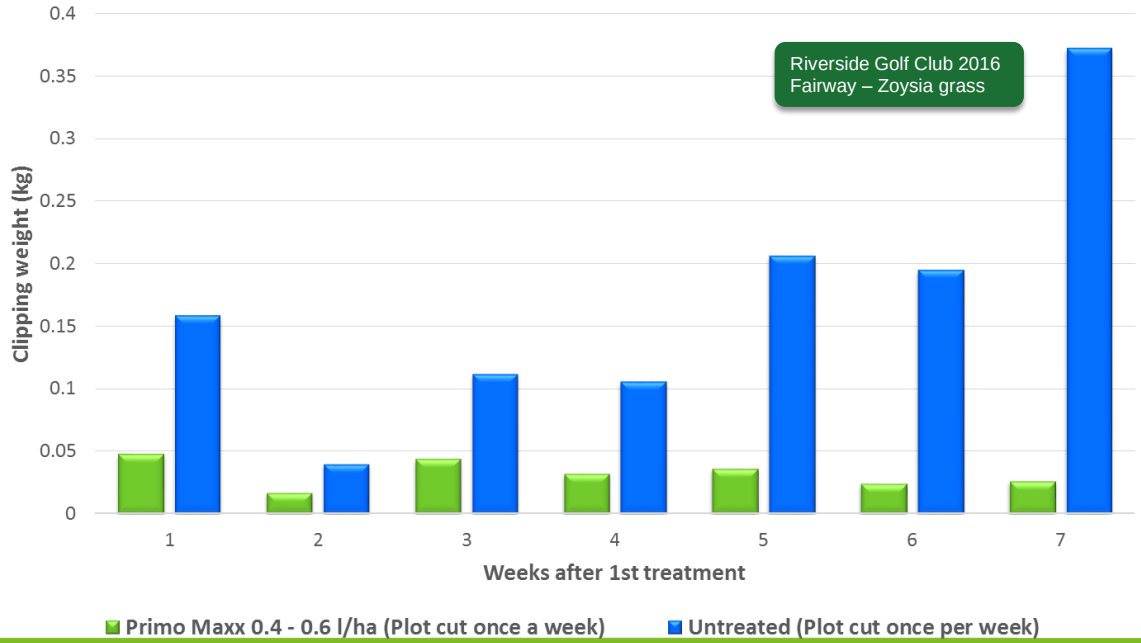
The ‘Primo effect’ on zoysiagrass 7 weeks after 1st treatment under standard mowing regime

Primo Maxx 0.4 – 0.6 l/ha every 14 days
Plot cut x2 per week

Untreated
Plot cut x2 per week

Primo Maxx – regulating fairway

Clippings reduced by 60 - 90% for at least 7 days on Zoysia fairway without mowing



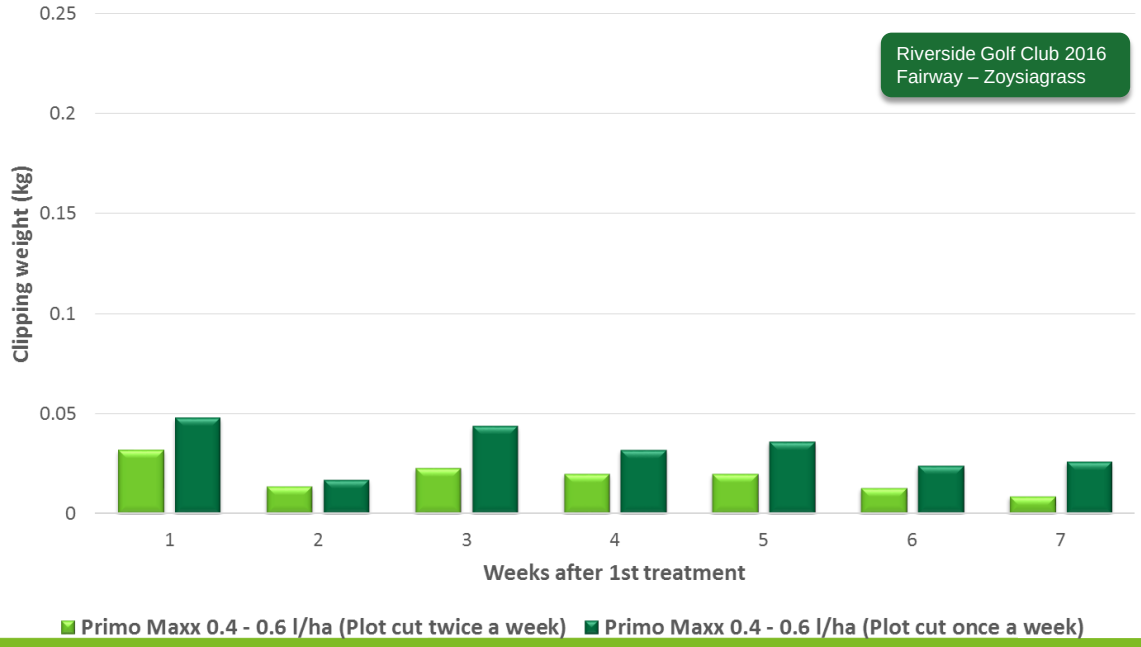
The ‘Primo effect’ on zoysiagrass 7 weeks after 1st treatment under reduced mowing frequency

Primo Maxx 0.4 – 0.6 l/ha every 14 days
Plot cut x1 per week

Untreated
Plot cut x1 per week

Primo Maxx - regulating fairway

Growth of Zoysia regulated for 7 days without mowing



The ‘Primo effect’ on zoysiagrass 7 weeks after 1st treatment under standard and reduced mowing regime

Primo Maxx 0.4 – 0.6 l/ha every 14 days
Plot cut x2 per week

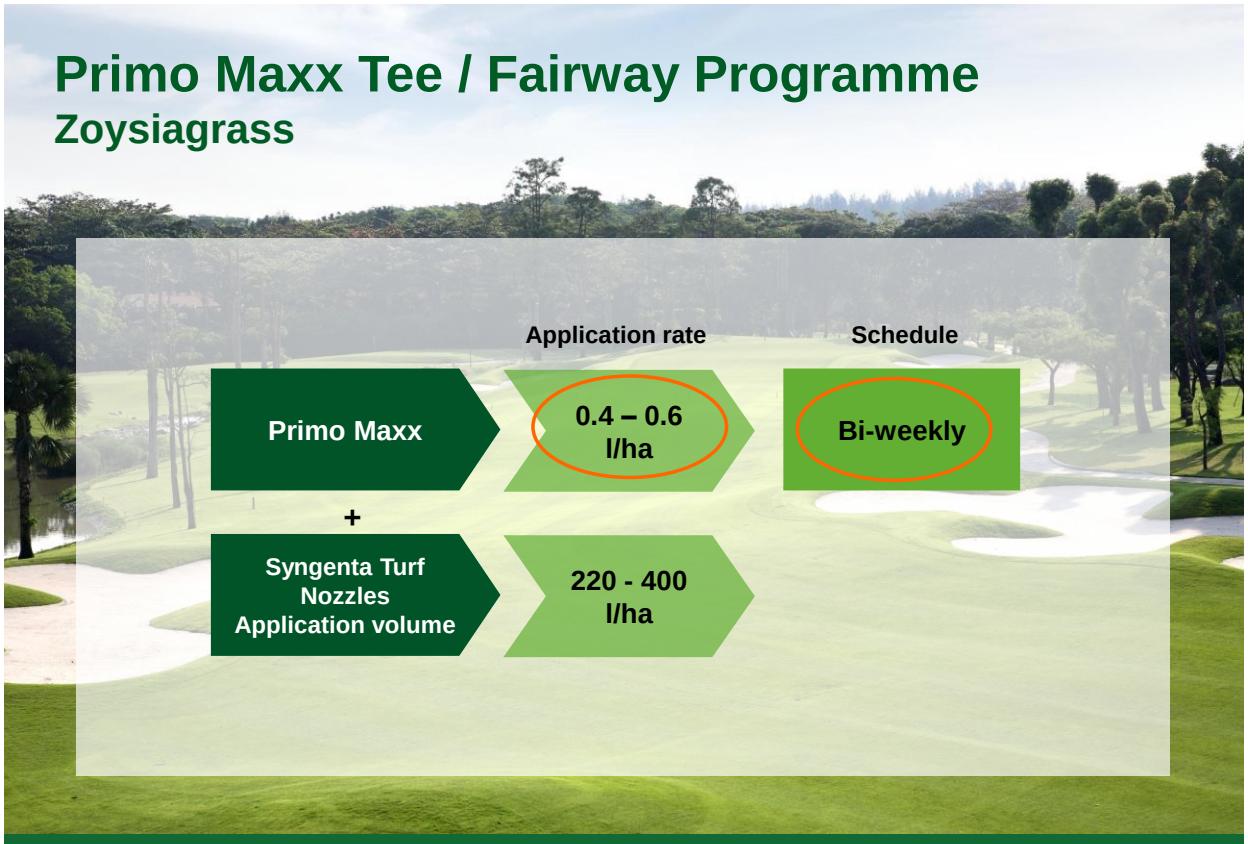
Primo Maxx 0.4 – 0.6 l/ha every 14 days
Plot cut x1 per week

Primo Maxx delivers a cleaner finish with less clippings

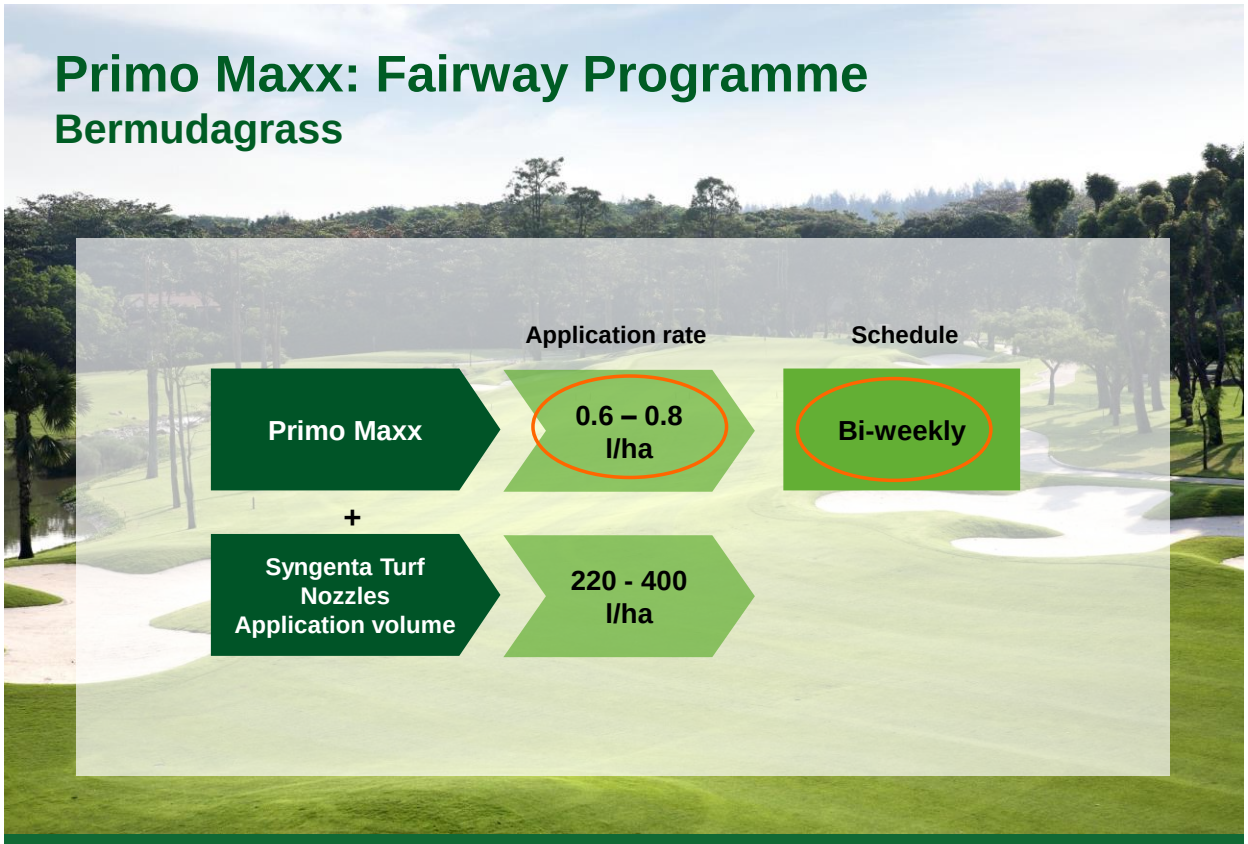
Primo Maxx	Untreated

syngenta®

Primo Maxx Tee / Fairway Programme
Zoysiagrass



Primo Maxx: Fairway Programme
Bermudagrass



Primo Maxx Programme

Bermudagrass: Fairways

syngenta®

Primo Maxx Programme

Bermudagrass: Residential & Commercial

syngenta®


Thank you
syngenta®
TM