

Growth Regulators

Presently Available Growth Regulators

Moddus	(Primo in USA)
Ethrel	(Proxy in USA)
Paclobutrazol	(for Poa control as opposed to genuine growth regulator and so not covered here)

MODDUS

Mechanism of operation

Type II Growth regulator that inhibits the production of gibberellins. Consequently cell elongation and hence internode length is reduced, i.e. vertical growth is reduced and density is improved.

Grass species

Moddus is either registered in the USA (as Primo), or known to be safe for use on:

- Bentgrass (Colonial browntop and Creeping bentgrass)
- Cynodon
- Fescues (Chewings', Red and Tall fescue)
- Ryegrass
- Kentucky Blue grass
- Kikuyu
- Poa (*P.annua* and *reptans*)
- Other (Zoisyia, St Augustine, Centipede grass etc)

Benefits from Moddus

Playing Benefits	Management Benefits	Plant Responses
Increased green speed (approximately 0.5 - 1 feet) increased outfield speed (hockey, cricket outfield).	Reduced requirement for mowing (up to approximately 50%).	Reduced vertical elongation of the leaf or tiller.
Improved playing consistency throughout the day and/or year (greens, collars, fairways cricket outfields).	Greater longevity of fungicides.	Increased density (tiller number).
Reduced puffiness (green collars, fairways approaches).	Reduced water requirements.	Increased stolon/rhizome growth or extension.
Improved lies i.e. tighter, denser surface (fairways, collars, semi rough).	Reduced need for line marking.	Potentially deeper root development.
Improved trueness of the ball roll on greens, collars and approaches, cricket outfields.	Reduced risk of scalping particularly within fairways (Cynodon, Kikuyu).	Reduced seedhead production (Poa, Cynodon and possibly Kikuyu).
Reduced clippings.	Potential to assist in encouraging browntop on mixed greens, as the Poa is less likely to smother the browntop.	Reduced clippings.

Disadvantages of Moddus

- Reduced recovery of pitch marks particularly on short Par 3's or small greens.
- During winter slower recovery from disease, particularly fusarium.
- "Mad or straggling tiller syndrome" appears to occur more frequently on Poa.
- Minor yellowing where the product has been in applied in bright sunny or hot conditions.
- Use on broadleaf weeds - may cause growth reduction there and hence reduce effectiveness of herbicide applications for control.

Note: Moddus does not effect broadleaf weeds, so issue is with the recovery of the turf within the thinned area due to the removal of weeds.

- Some grasses, Yorkshire fog and Vernal are not affected.
- Timing of application relative to renovation.

Note: May delay the recovery from renovation. In SI was stated that hastened recovery from renovation, presumably due to increased tillering/stolon growth.

MODDUS PROGRAMMES

New Zealand Situation

Greens

- 200-250ml/ha/month.
- Can be where you have adequate growth, used throughout the year but be aware that recovery from fusarium can be slower.
- Possibly don't use it in winter if there is a fusarium problem.
- Also timing of application relative to renovation.
- Effects will be noticed as soon as 4 to 5 days following application.
- Must keep up your normal (well adequate) nitrogen programme.
- Do not apply to diseased turf.

Fairways/sportsfields/bunker faces

- Rates in the order of 500mls - 1L/ha are used.
- Product longevity is rate dependent and at full rate will provide results for 8-10 weeks.
- Increasing the longevity of line marking (20mls/L of line marking solution).
- At major venues and in particular for cricket outfield to;
 - reduce the amount of clippings produced
 - improve both the speed and consistency of the outfield
 - improve the trueness of the ball roll
 - assist to manage "mad tiller disease" sometimes seen on ryegrass.
- Special events/situations such as where a stage is required, or surface protection systems are used.
- With the ever increasing cost of fuel and subject to both contractual conditions and its cost effectiveness (Moddus product cost @ 1L/ha \$160-00 for 6-8 weeks) Moddus has the potential during periods of very heavy growth to reduce the frequency of mowing required.

Malaysian Situation

Greens

Uses it in low light conditions, get excessive leaf extension then scalping and then Curvularia.

- Especially around the monsoon time (November)
- Use of Moddus stops that extension and prevents scalping.
- Thinks that it causes more mutation of hybrid Bermudas

Programme

Initially monthly applications at 200ml/ha. Now applies Primo fortnightly at 140ml/ha all year.

Fairways

- Reduces mowing, increases lateral growth so better divot recovery.

ETHREL

Mechanism of operation

Generates ethylene which prevents initiation of flowerheads.

Benefits

The main benefits from using Ethrel on greens are:

- Improved green speed.
- Improved trueness of ball roll.
- Improved presentation.
- Improved putting consistency throughout the year, i.e. the low points over spring, when Poa is seeding should be reduced or avoided.
- On mixed greens, an additional advantage is preventing the presence of Poa seed within the greens/collars when the surface is “open” due to renovation.

Programme

In order to prevent seedheads, Ethrel needs to be applied to apply before flower heads form. Otherwise the initiated flowerheads will appear, but thereafter subsequent initiation is prevented for 6-8 weeks.

Flower head initiation in Poa can be recognised by looking at the base of the tiller which swells when the flower head is being formed. This is referred to as the “boot phase.”

Ethrel can be applied alone at 7.5 - 10 L/ha.

Research has shown that results are improved and potential phyto toxicity is less where it is applied as a tank mix with Moddus i.e.

- Two applications, six - eight weeks apart of
- Moddus 200-250ml/ha in mid- late August and
- Ethrel 7.5L/ha

GENERAL COMMENTS

- Has been recommended on browntop/bentgrass greens and collars 3 weeks prior to renovation to prevent any Poa seed being present/given the opportunity to establish when the greens’ surfaces are open
- Ethrel on its own can cause a short term yellowing of poa. This is reduced when tank mixed with Moddus or a nitrogen application scheduled 2-3 days prior to its use.
- Overseas literature notes that very frequent applications in close proximity (<21days apart) can cause a thinning of the greens cover.
- Ethrel is very acidic and at this stage would be wary of recommending its use in unproven tank mixes.