Research Technical Note
Urban Greenery Series
RTN
06-2016
October

Common Weeds in Response to Plant Growth Regulator (Trinexapac-ethyl)

Author: Vivek Govindasamy

Background

Earlier trials conducted by CUGE proved that Plant Growth Regulator (PGR) application on turf helped to restrict shoot height and ultimately helped to cut down mowing/grass cutting frequency and cost. In general, a turf site has to be uniform and weed free. However, it is practically challenging to maintain uniform and weed-free turf sites especially on large parks and long stretches of streetscapes. On top of this, PGR application was rather challenging at sites where there were moderate to high weed invasion i.e. the weeds were growing faster than turf. This led us to ask, is PGR effective in restricting weed growth?

Fig. 1 Selected sites - Kallang Sector (**top**) & Kampong Arang Road (**bottom**)

Methodology

In a six-month study conducted by the Centre for Urban Greenery & Ecology in collaboration with Streetscape division, Trinexapac-ethyl (Primo 250 EC) was applied on two sites with *Axonopus compressus* that were invaded with common tropical weeds. The two sites identified and chosen were Kallang sector and Kampong Arang Road. Experimental plots (three control and three treatment plots) were marked on the chosen sites. All the grasses were mowed but PGR was sprayed on the mowed grasses for the treatment plots only. The grasses were maintained uncut for a period of 6 weeks until the treatment plot visually appeared to be tall with weeds reaching 15 cm height. The above process (cycle one) was repeated as cycle two and cycle three (i.e.) mowed the grasses, sprayed PGR (only on treatment plots) and maintained uncut for 10 weeks. PGR was sprayed at a concentration of 1.5 l/ha. The parameters that were measured were turf quality, shoot height and relative shoot height.

Findings

- PGR application proved to restrict weed growth but its effect varied with weed species
- 30-40% shoot growth restriction was observed in many weed species
- Certain weed species declined after grass cutting followed by a PGR application

Table 1.1 List of weeds identified in the chosen sites:

Sites	Weeds species
Kallang Sector	*C. rotandus, C. cinereum, A. gangetica, Cleome sp, T procumbens, P. niruri, Digitaria sp, lalang*
Kampong Arang Road	*C. cinereum, A. gangetica, P. niruri, Digitaria sp.*

Fig. 2 Post PGR application effect on *Cyanthillium cinereum* - control (**left**) & PGR (**right**)

Fig. 3 Post PGR application effect on *Phyllanthus niruri* - control (**left**) & PGR (**right**)

Fig. 4 Post PGR application effect on lalang - PGR (**left - 51.3 cm**) & control (**right - 81.1 cm**). PGR (leftside) has reduced shoot height and late flowering - difference in shoot height is 33.8cm (28.8%)

Table 1.2 List of weeds identified in the chosen sites:

Parameters	1st cycle 30 Jan (45 DAS)			2nd cycle 08 apr (45 DAS)		
	Control SH in cm	PGR SH in cm RSH in %	PGR RSH in %	Control SH in cm	PGR SH in cm	PGR RSH in %
C. rotandus	23.5	18.6	20.85	21.2	19.9	6.13
C. cinereum	19.1	18.9	1.05	25.3	16.5	**34.78**
A. gangetica	6.4	4.4	**31.25**	9	8.6	4.44
Cleome sp	17.8	10.9	**38.76**	18.8	12.3	**34.57**
T. procumbens	11.6	10.1	12.93	19.8	17.2	13.13
P. niruri	10.4	7.2	**30.77**	9.2	7	23.91
Digitaria sp	10.8	5.7	**47.22**	16.7	12	28.14
Lalang	54.7	48.1	12.07	85.1	51.2	**39.84**
A. compressus	10.3	7.1	**31.07**	8.23	6.13	25.52

Table 1.3 PGR application rate followed in this study:

Parameters	1st cycle 30 Jan (45 DAS)			2nd cycle 08 apr (45 DAS)		
	Control SH in cm	PGR SH in cm RSH in %	PGR RSH in %	Control SH in cm	PGR SH in cm	PGR RSH in %
A. gangetica	11.6	10.4	10.34	11.7	10.5	10.26
Digitaria sp	10.4	9.3	10.58	9.5	7.3	23.16
P. niruri	9.5	7.1	25.26	8.7	5.4	**37.93**
C. cinereum	18.2	15.3	15.93	0	0	0
A. compressus	10.3	7.1	**31.07**	8.23	6.13	25.52

For both table 1.1 & 1.2:

SH - shoot height, RSH - Relative shoot height (Relative to control)

Relative shoot height more than 30% have been highlighted.

The readings were taken 45 days after mowing and PGR application.

Note: cannot perform statistical analysis because of the poor sample size of weeds at the site which was erratic and controlled by nature.

DAS - Days after spraying

Application:

The study demonstrated that PGR application reduced the clipping yield of turfgrasses and common weeds. As seen in earlier studies, turfgrass mowing frequency can be reduced by 8 mowings or grass cutting per year, translating to an approximate30 % manpower saving. For this study, PGR application was shown to be effective in restricting weed growth. However, weeds were still taller than the turfgrass (*Axonopus compressus*) even after a 20-50% reduction in shoot height. This calls for grass cutting even when the actual turf is short enough with restricted growth. As such, PGR application on turf is more feasible on sites with low weed invasion. It is recommended to use PGR (Trinexapac-ethyl) at the rate of 1.5 l/ha for mowing reduction on sites where the turf has a good uniformity – with lesser weeds.

Acknowledgement:

- Karen Chew – Streetscape, NParks
- Patrick Sia – Streetscape, NParks