



Natural Area Division

Gloriosa superba
(Glory Lily)
Herbicide Trials



Cooperative Research Partnership

Sunshine Coast Regional Council

(Michael Gilles, Community Natural Area Officer)

SEQ Catchments

Technigro

(Steve Milner, Technical Officer Natural Area Division & Trevor Armstrong, Consulting Agronomist)



Gloriosa superba is a herbaceous annual climber with subterranean perennial tubers which presents red and yellow balloon shaped flowers.



A native of Africa and Asia, it has for many years been cultivated as a garden ornamental but has now escaped beyond the boundaries of the backyard.

- The dense underground tuber networks of *Gloriosa superba* form a mass of above ground stems
- The stems are capable of growing prostrate or as a scrambling vine up to 4m in the understorey forming dense carpets
- These infestations can contain up to 100 stems/m²



- Infestations have been recorded locally from Yaroomba to Mooloolaba
- Primarily occupying dunal systems and adjacent coastal vegetation communities
- *Gloriosa superba* can displace local native plant species and significantly impact biodiversity within the areas it occupies
- *Gloriosa superba* thus far has proven difficult to control & natural area managers are recognising the threat and beginning to focus on developing best practice management methodologies

- Recent potted plant trials using low doses of 2,4-D and Brush-Off undertaken by DNRMW&E have resulted in the successful deterioration of tubers and plant destruction
- These trials however have been restricted to a controlled environment and have been untested in the field
- An appeal for further infield trials has seen a cooperative research partnership between the Sunshine Coast Regional Council, SEQ Catchments and Technigro form
- Michael Gilles from the Sunshine Coast RC is driving this trial project in an effort to establish an effective best practice methodology for possibly the last remaining weed on the coast that does not have a current proven control method

The objectives of the trial are to;

- Field test the recommended chemical application of 200 mL 2,4-D amine + 5 g metsulfuron-methyl + 100 mL BS 1000[®] 100 L⁻¹ water established during potted trials by the DNRMW&E
- Evaluate the application timing to ensure that the use frequency is effective but not excessive
- Determine whether there are any effects on non-target species

Location of Trial Sites

- Three trial sites have been established within the Marcoola, Mudjimba Foreshore Bushland Conservation Reserve
- The trial sites are located within the frontal dune system which are comprised of a complex vegetation community of foredune herbland and frontal dune heath and scrub, *Casuarina equisetifolia* and *Banksia integrifolia* low woodland and low-open forest

Local Distribution



0 25 50 100 150 200 Meters



Map Created
Bushland Services
October 2007

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Trial Design and Layout

- Six (6) plots 10 m x 10 m (100 m²) have been laid out within each of the three identified sites
- The layout of the control plots vary between sites depending on the individual characteristics of each, including vegetation width and physical obstructions
- Each plot has been separated by a buffer zone of a minimum of 1m

Application Treatment

- Plot trials undertaken by Sparkes and Rogers (DNRMW&E) found that reduced tuber size and vigour resulted from lower dosages of folia application of 200 mL 2,4-D amine + 5 g metsulfuron-methyl + 100 mL BS 1000[®] 100 L⁻¹ water
- Sparkes and Rogers suggested that foliar application should correspond to the growth stages of *Gloriosa superba* which occur through October – November, and that follow-up applications should be undertaken in February - March

Shoreline

Plot 1
Year (1) November application only

Plot 2
Year (1) Nov & Feb application

Plot 3
Year (1) February application only

Plot 4
Years (1&2) November application only

Plot 5
Years (1&2) Nov & Feb application

Plot 6
Years (1&2) February application only

Plot Layout

To evaluate the required field application frequency and ensure that the use of the prescribed treatment is effective but not excessive, applications are being undertaken at the frequencies illustrated here.

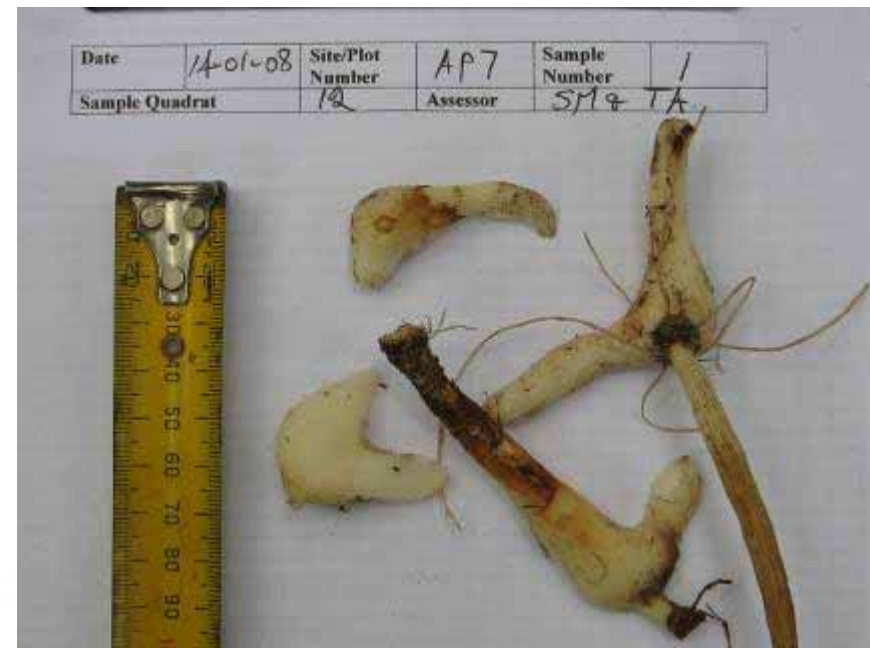


Assessment, Recording and Measurements

- The evaluation of the effectiveness of herbicides is often difficult due to phytotoxicity effects on foliage with limited effect on the actual tubers
- To counter this problem a 300 mm x 300 mm hole is being excavated bi-monthly within each plot to assess the condition of the tubers
- Observations are being scored using a convenient qualitative scale developed by Sparkes & Rogers (DNRMW&E)

Assessment, Recording and Measurements

The excavated tubers are also being photographed to support the qualitative assessment identifying the date, plot number and sample number.



Assessment, Recording and Measurements

- To ascertain if there are any effects on non-target species, species composition or percentage cover a health assessment has been undertaken within each plot prior to the commencement of any herbicide applications. Observed effects if any are being recorded
- Also being recorded are observations on weather conditions around the time of applications including rainfall 2 days before and after, temperature and wind speed



Assessment, Recording and Measurements

On 14/1/08 & 7/5/08 folia and excavated tuber inspections revealed the following evaluations on both the *Gloriosa superba* and associated vegetation on the treated plots:

Treatment 1 has resulted in leaves yellowing and some stem dieback above ground. Below ground tubers show no effect at this stage. This treatment showed some effect on *Asparagus aethiopicus*. *Wilkstroemia indica* was defoliated by less than 10%. Some new *Gloriosa* seedlings were evident in May 08

Assessment, Recording and Measurements

Treatment 2 has resulted in leaves becoming necrotic with some stem death above ground. Below ground tubers show little affect. This treatment showed some affect on *Asparagus aethiopicus* and *Passiflora* spp.

Treatment 3 has resulted in necrotic leaves and some stem dieback above ground. Some below ground tubers are less than 70% of normal size; some are dehydrated while some are still healthy. This treatment showed some affect on *Asparagus aethiopicus*

Assessment, Recording and Measurements

Treatment 4 has resulted in some necrotic leaves and stem dieback above ground. Below ground tubers showed dehydration and some heavy wrinkling. Some new *Gloriosa* seedlings were evident in May 08

Treatment 5 has resulted in necrotic leaves and stem dieback > (greater) 20cm above ground. Some below ground tubers showed dehydration. Some young regrowth was evident by May. One juvenile *Acacia melanoxylon* looked affected

Assessment, Recording and Measurements

Treatment 6 has resulted in some leaves yellowing, necrotic with some stem dieback to < (less) 20cm above ground. Below ground tubers remain healthy

Treatment 7 has resulted in some leaves yellowing, necrotic with some stems dead and some stem dieback > (greater) 20cm above ground. Below ground tubers were mostly still healthy while some showed dehydration. Juvenile *Alectryon coriaceus* plants had leaf tip burn in January with some effects still evident during May possibly as the result of root uptake and or overspray

Assessment, Recording and Measurements

- Untreated checks of *Gloriosa superba* remained healthy during January and May assessments, continuing to flower, reproduce sexually and vegetatively. Flowering and reproduction had ceased at all treated plots during formal assessments
- Further visual assessment in June 08' showed *Gloriosa superba* plants during senescence on sunny exposed east and western borders to be holding some immature seed pods and large numbers of mature seeds. During this assessment it was also observed that there was no evidence of any *Gloriosa superba* foliage on any of the treated plots

Assessment, Recording and Measurements

General Comments – At this stage of the trial it is too early to draw any definite conclusions as to the effectiveness of the treatments on *Gloriosa superba*'s underground tubers as these tubers facilitate long term storage of starch for perennial growth. The treatment schedule for Dec 08 and Feb 09 and subsequent assessments will examine if these will be sufficient to control tubers. The application of herbicides on plot sites so far indicate little or no impact on native vegetation

Thank you to;

Cooperative Research Partnership

Sunshine Coast Regional Council

Michael Gilles, Community Natural Area Officer

SEQ Catchments

Technigro

Steve Milner, Technical Officer Natural Area Division

Trevor Armstrong, Consulting Agronomist

Thank you.....

