Bridal Creeper

Asparagus asparagoides

Management Strategy
2005 – 2015

LANDCARE
EAST GIPPSLAND

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On behalf of the East Gippsland Landcare Network

Executive Summary.

In 2004 – 2005 the East Gippsland Landcare Network received funding to undertake the "*'Catching the Creeper', A* regionally integrated response to Bridal Creeper control" project, through the Australian Government Envirofund, incentive scheme.

This Management Strategy 2005 –2015 provides background information on Bridal Creeper as a Weed of National Significance. It also covers details of the plant, growth calender and management techniques. It provides descriptive information of the biological control techniques that have been utilised across parts of East Gippsland over the past five years.

The Management Strategy attempts to identify management options and control strategies for the next ten years and recognises the need to establish greater community awareness and involvement in the overall 'fight' to reduce the infestations of Bridal Creeper up to 70 % by 2015.

The past work of those involved in attempting to reduce Bridal Creeper infestations must be acknowledged and congratulated. In particular the team from the East Gippsland Shire for their massive efforts during 2004 in releasing the Bridal Creeper rust fungus at over four hundred sites; the team from Department of Primary Industries for their involvement in the development and releases of biological control agents and those from Department of Sustainability and Environment who have had the foresight to be involved.

Bridal Creeper
(Asparagus asparagoides)

1. Introduction

Bridal Creeper *(Asparagus asparagoides)* was introduced to Australia from South Africa in 1857 for use in gardens, bridal bouquets and hanging baskets. Since that time it has moved beyond the suburban gardens and has become a serious environmental weed throughout South Eastern Australia. Bridal Creeper is a Weed of National Significance (WONS) and is regarded as one of the worst weeds in Australia because of its invasiveness, potential for spread and its environmental impacts.

A major weed in bushland, its climbing stems and foliage smother native plants. It forms a thick mat of underground tubers which impedes the root growth of other plants and often prevents seedling establishment.

It invades undisturbed habitats and is a major threat to lowland shrubs and ground cover species, particularly in wet and dry sclerophyll forests, creek and river banks and heathland areas. It is considered particularly invasive as it does not require disturbance to establish.

1.1 The Plant

Bridal Creeper has annual, climbing shoot growth from a perennial root system consisting of many tubers grouped along a central rhizome. The underground mat of rhizomes and tubers make up the bulk of the plant (90 %). These provide water, energy and nutrients that enable the plant to survive over summer and allow rapid shoot growth in autumn.

Bridal Creeper can grow in most soils but is most common close to the coast where it invades woodlands and other open coastal vegetation. It is particularly vigorous in alkaline soils and thrives in areas high in nutrients such as drainage lines. Roadsides next to farms are also favoured sites due to increased nutrient levels from

fertilised paddocks. Bridal Creeper is frost tolerant and its perennial root system enables it to survive summer drought.

Twisting stems can grow up to three (3) metres in length, with leaves grouping on short side branches. Numerous shoots are produced from one patch of roots and entwine with each other and native vegetation, making it almost impossible to identify individual plants.

Bridal Creeper produces pea sized green berries (up to 1000 per square metre) which ripen to red, and contain a number of small black seeds. Birds feed on the berries and later excrete the seeds at perch sites. This seed dispersal has seen Bridal Creeper spread to roadsides and further afield amongst native vegetation. Foxes and rabbits are known to eat the fruit and disperse the seeds.

The potential for Bridal Creeper to establish beyond its current distribution is dramatic where it could pose a further threat to biodiversity and conservation of natural ecosystems.

1.2 Growth Calender

Seeds germinate in autumn and winter, in leaf litter and at soil depths of up to ten centimetres. Buried seed that does not germinate, rots within two (2) years, while seeds on the soil surface may be viable for at least three (3) years.

Shoots of Bridal Creeper emerge in autumn but earlier emergence can occur with high summer rainfall. In some cases shoots may be present year round particularly where areas have high summer rainfall or are under irrigation. Plants generally take three years to reach flowering stage. The flowers appear along the length of the shoots in August and September. The green berries turn red in late spring, early summer.

Differences in fruit production can occur between years and sites. Early autumn rains allow a longer growing season, which favours high fruit production. The amount of fruit set is greater where shoots are able to grow vertically by climbing trees and shrubs, and less where plants are heavily shaded.

Leaves turn yellow and fall and stems die back in late spring, early summer as temperatures rise and soils dry off.

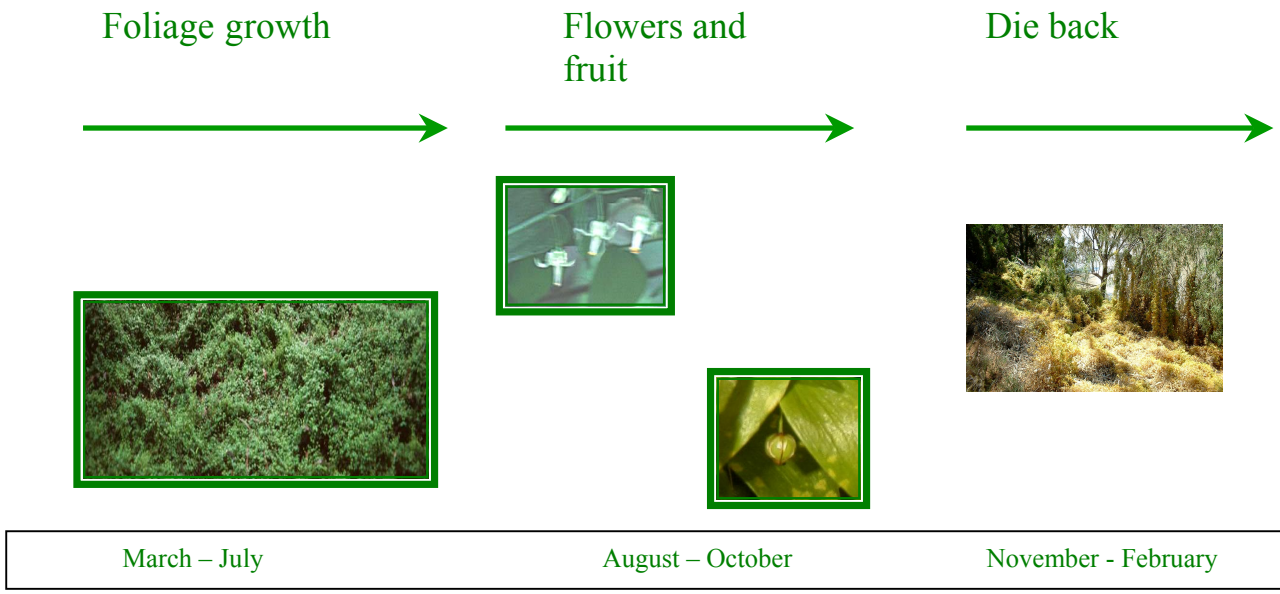


Figure 1 : The Growth Calender for Bridal Creeper

2. Management and Control of Bridal Creeper

Bridal Creeper has a number of features that make it difficult to control/manage such as :

- Its tuber reserves provide a buffer against adverse seasons/conditions
- It has a wide germination range
- It can invade previously undisturbed sites

It also has its weaknesses

- It has a relatively short lived seedbank
- Seed production only occurs on early emerging stems
- Seed output in old infestations is small.

2.1 Prevention of Spread

The most ideal method for reducing the likelihood of further infestations of Bridal Creeper is prevention. It is also the most cost effective means of weed control.

The starting point for this is to discourage the use of the plant as an ornamental species in domestic gardens. In some Australian States, it is illegal for nurseries to sell Bridal Creeper,

unfortunately this is not the case in Victoria. It is known to be sold at nurseries, local markets and can be passed on from gardener to gardener. In order to discontinue this practice an extensive community education and awareness campaign is essential.

In areas where Bridal Creeper is present, a containment program around existing infestations assists in limiting its further spread. The establishment of buffer zones around infestations is a useful start. These zones should be at least five hundred (500) metres around the edge of an infestation. Generally seeds are dispersed within one hundred (100) metres of the parent plant. The traditional approach has been to focus on the small patches at the edge of an infestation, working back towards the centre. An alternative approach is to target the climbing infestations that produce the most seed and are most attractive to birds. A combination of these two practices is desirable.

2.2 Integrated Management

Integrated management should form the basis of any control program for Bridal Creeper as one control/management method singularly, may not be successful. The environment in which any control/management program is to take place should also be considered in determining management actions.

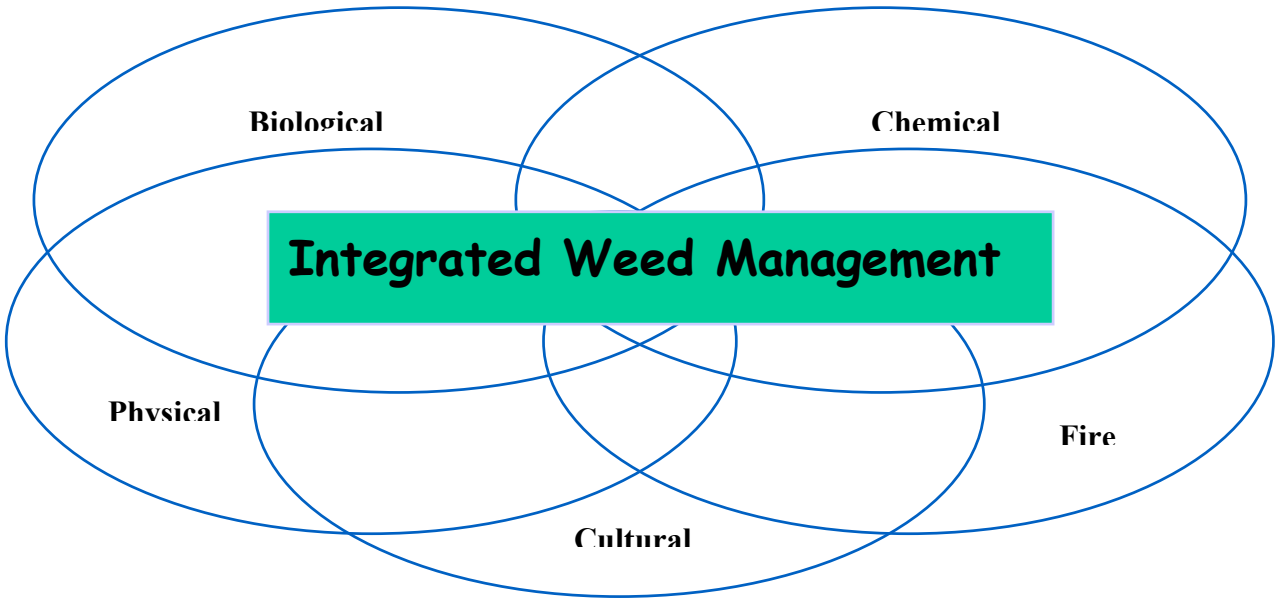


Figure 2 : Integrated Weed Management

2.3 Management Techniques

2.3.1 Chemical Control

Herbicides have been known to be effective in controlling Bridal Creeper. Trials have occurred with a variety of chemicals, with no one chemical approved for use in Victoria on Bridal Creeper. As Bridal Creeper often grows in areas of native vegetation, it is important if applying herbicides to do so carefully, avoiding off-target contact.

2.3.2 Biological Control

Bridal Creeper is not considered a weed in its native South Africa as it is kept under control by its natural enemies. Three of these natural enemies have been introduced to help control Bridal Creeper in Australia :

- The Bridal Creeper leafhopper *(Zygina sp)*
- Rust fungus *(Puccinia myrsiphylli)*
- Leaf beetle *(Crioceris sp)*

Each of these organisms were rigourously tested to ensure that they are specific to Bridal Creeper and so will not threaten other plant species.

The leafhopper was first released in Australia in 1999. The adult is white, 2 – 3 mm long and lives on the underside of the leaves of the plant. Both the adults and juveniles feed on the leaves, causing them to turn white, and in severe cases fall off. The plant continues to grow but less vigourously. Continual damage over several years may reduce new tuber production, therefore making it less competitive.

Each female can lay two hundred (200) eggs over a six (6) week period and has multiple generations a year. This enables the leafhopper to build quite rapidly in numbers.

Three year old leafhopper damage Lakes Entrance October 2004

The rust fungus was first released in Australia in 2000. The fungus attacks both leaves and stems of Bridal Creeper, reducing the amount of green plant material. It can produce many generations a year resulting in large amounts of wind dispersed spores. It produces an over-summering spore to survive summer in the absence of the plant. It spreads within and across infestations efficiently.

Two year old rust fungus damage Walpa October 2004

The leaf beetle was first released in Western Australia in 2002. The grubs of the beetle cause major damage by stripping shoots and leaves that enable the plant to climb. By stopping the Bridal Creeper from climbing the plant will stop fruiting and spreading to new areas. The beetle was released in Victoria in April 2005.

2.3.3 Physical Control

Physical removal will not effectively control Bridal Creeper unless all the rhizomes are dug up and destroyed. This is possible for new, small infestations, or as a follow up to years of chemical control of larger infestations. Digging is too time consuming and too disturbing to soil in native vegetation areas to be used as the primary control mechanism.

2.3.4 Fire

Fire can help in larger infestations. However, fire is not recommended for the sole purpose of controlling Bridal Creeper and should only be adopted if useful for other land management needs. If fires occur in late summer - early autumn, it can remove all understorey vegetation, improving access for later spraying. As Bridal Creeper often emerges before the first autumn rains herbicides may be applied prior to post fire regeneration of native vegetation. In addition to improving the effectiveness of herbicide application, fire may help to destroy seed and the dense tuber mat of Bridal Creeper.

2.3.5 Grazing

Grazing can also provide some control, but like fire, is only practicable if already being used for other land management purposes. In other Australian states, Bridal Creeper has been kept at low levels by wallabies and sheep foraging under trees in remnant vegetation and shelterbelts. This however, may not be a viable alternative in some areas of native vegetation in Victoria.

2.3.6 Mechanical Control

Mechanical control can included methods such as slashing or bulldozing. As with physical removal of the Bridal Creeper, mechanical control is not an effective means of control unless all tubers and rhizomes are dug up and destroyed. The other issue is that mechanical control methods further disturb the soil which

assists Bridal Creeper spread. This may not be appropriate in areas of native vegetation.

Slashing the stems and leaves may prevent fruit production and slowly deplete root reserves but will not eradicate an infestation.

2.4 Disposal of Bridal Creeper

If Bridal Creeper plants are being removed they must be disposed of appropriately. Care should be taken because of the ready ability of the rhizomes and tubers to spread. Ideally root material should be dried before being bagged for disposal. Drying can be achieved more quickly by storing the tubers beneath plastic in open sunlight to create a hot glasshouse effect. Fruiting material should be bagged immediately, to avoid being dropped or dispersed by birds. Disposal should be at municipal tipping facilities that follow Australian Standards for composting and transfer station management best practice guidelines. The plant material should not be incorporated into mulch unless completely killed.

3. Bridal Creeper in East Gippsland

3.1 Distribution

Bridal Creeper distribution across the East Gippsland Shire is not totally known as all areas within the Shire have not yet been mapped. A greater knowledge has developed over the past twelve months with most areas between Bairnsdale and Lakes Entrance recorded. This includes infestation size and density. Most of the areas are in close proximity to either river systems or towns/areas bordering the Gippsland Lakes system or roadside reserves.

3.2 Mapping of Control Sites in East Gippsland

As part of the *'Catching the Creeper'* project all sites where the rust fungus was released were individually recorded with GPS for future monitoring. Included in the recording were infestation size, density and more precise details of location of each release.

This information has been provided to both Department of Sustainability and Environment (DSE), (Flora & Fauna) and Department of Primary Industries (DPI) Frankston, (formerly known as Keith Turnbull Research Institute) to enable mapping and future monitoring of Bridal Creeper control sites. (See Appendix 10)

3.3 History of Control Strategies in East Gippsland

Documentation of control strategies prior to 2004 only includes biocontrol agent releases.

2000

- Leafhoppers released at a total of eleven sites
- 78% (7/9) of sites monitored have established
- Public or Crown Land nine (9), Private Land two (2)
- Sites extending from Lake Bunga to Eagle Point

2001

- Total of two (2) sites
- One (1) release of rust fungus at Eagle Point Reserve
- One (1) release of leafhopper at Lakes Entrance Walking Track
- Both sites have established well.

2002

- Total of twelve (12) sites
- Five (5) rust fungus
- Seven (7) leafhopper
- 66% (2/3) of rust fungus and 50% (1/2) of leafhopper sites monitored have established
- Walpa, Bairnsdale, Bruthen, Metung
- One site included leafhopper for rearing by Forestech TAFE students
- All sites Public/Crown Land/National Park
- Community field day held June 2002

2003

- Total of nineteen (19) sites
- Fifteen (15) rust fungus
- Four (4) leafhopper
- At least eleven (11) rust fungus sites have established and 7 leafhopper sites
- A community redistribution day held at Eagle Point July 2003
- Mostly Public/Crown Land/National Park, one confirmed private land and four unknown
- Sites include three (3) in the Far East Gippsland area of Mallacoota, Genoa and Cann River and otherwise extend from Mitchell River through to Metung

2004

In 2004 the East Gippsland Shire Council (EGSC) received funding through the Federal Government's National Heritage Trust program. In addition, the East Gippsland Landcare Network (EGLN) was funded to undertake onground works and further develop management planning for Bridal Creeper in East Gippsland through the Federal Government's Envirofund. This funding allowed an extensive biocontrol agent release program to be undertaken on Shire managed land and where appropriate, other Crown Land and private property managed by Landcare members.

The large scale redistribution of Bridal Creeper rust fungus made possible by this project will enable significant areas to be available for the harvesting of the fungus in future years and lead to more rapid biological control of bridal creeper throughout the region.

- A total number of four hundred and thirty one (431) rust fungus release sites set up
- Trial of three (3) sites with rust fungus spore water, two (2) roadside and one (1) riverbank sites
- Public/Crown Land 410 sites, Private Land 21 sites
- Areas of high conservation value and dense infestation were targeted
- Geographical area covered extended from Strathfieldsaye in the West to Lake Tyers in the East.
- Forestech students, a Greencorps team and three casual staff were trained in the release and monitoring of biocontrol agents.
- All known Bridal Creeper infested sites in the region were mapped.
- 99% (82/83) of rust fungus sites monitored in October 2004 had taken

Spore water trials

The trial of the rust fungus spore water followed some initial releases via the same method on Kangaroo Island in South Australia. Two roadside areas were sprayed with spore water over a two day period covering approximately two (2) kilometres. The two riverbank sites were treated slightly differently with one site sprayed three times and the other only once.

The monitoring of these sites showed mixed success with spore water treatments. Good signs of infection were observed after a short period of time at the roadsides, while at the riverbank sites only minimal infection was found. It will be essential to continue to monitor these sites over time to accurately gauge the measure of success.

In 2005, additional trials will be conducted by DPI Frankston in conjunction with East Gippsland Shire Council to help further develop and improve this method.

4. Management of Bridal Creeper in East Gippsland Beyond 2004.

4.1 Vision

To reduce Bridal Creeper in the East Gippsland area by 2015 by 70%

4.2 Objectives

- To establish priority local area management action plans for Bridal Creeper control/management in East Gippsland
- To continue to undertake and map biocontrol releases in East Gippsland.
- To contain and significantly reduce currently known Bridal Creeper infestations in the East Gippsland area.
- To identify and commence control/management of any new infestations of Bridal Creeper.
- To develop a comprehensive community education and awareness program on Bridal Creeper aimed at engaging the community in ongoing control and involving schools in the breeding and distribution of biocontrol agents.

4.3 Identification of Priority Areas for Control

In order to assist in the identification of priority areas for management/control, a priority ranking matrix has been developed.

The matrix identifies percentage cover of Bridal Creeper vegetation conservation status, previous control, accessibility and distance from known sites (See appendix 1). From this it will be able to be established which infestations should be the focus of attention for control.

In saying this however, past practice has been that satellite sites have been seen as priority control/management sites. It is recommended that this practice be continued to ensure prevention of further spread in these areas. (See appendices 2, 3 and 4 for DPI Expression of Interest Form; selecting suitable biocontrol release sites and Bridal Creeper rust distribution form).

This matrix will need to be initially trialed to assess its workability on ground. Once it has been clearly established that this is a useful model, training of community groups on its use will be required. Community groups will need to be trained on its use to ensure that it is effectively employed as a management tool and that risk of misinterpretation is reduced.

4.4 Integrated management

Integrated management is an essential component of any weed management/control strategy. No one-control method will be the sole solution to the Bridal Creeper problem, so a combination of techniques should be considered.

For the short to mid-term, it is recommended however, that biocontrol methods be considered as the first option for control/management. The exception to this may be with small isolated infestations, where physical removal may be more appropriate.

The community should continue to redistribute rust fungus using the standard rubbing method. Once the spore water concept has been better developed, this may then become the preferred option. (See appendix 5 for rust fungus release guidelines.)

It is recommended that the ongoing trial of rust fungus spore water continue. It is further suggested that the East Gippsland Shire Council's, Environmental Officer and DPI's Bridal Creeper Project Officer, provide advice on the refinement of the techniques used in the 2004 trials in order to further develop this control/management practice.

4.5 Monitoring

Ongoing monitoring of control sites is an essential component of Bridal Creeper management. The biocontrol site monitoring must remain consistent with previous monitoring in order to accurately reflect the effectiveness and spread of the biocontrol releases. The Department of Primary Industries should conduct the initial training of community members in this process.

Monitoring of other control methods will also need to be developed and undertaken. Photographic evidence is one way of doing this. (See appendices 6 & 7 for monitoring of Leafhopper and rust fungus)

4.6 Local Area Management Plans

In order to assist with the ongoing management of Bridal Creeper it is necessary to establish local area management plans. Initially this will mean developing individual property/site plans (see appendix 8), which then jointly become the framework for the area plans. Appendix 9 is the recommended outline of each of these plans.

4.7 Community Education and Awareness

In order to start winning the war on Bridal Creeper, the community need to become more aware of the species, its level of invasiveness and the associated environmental impacts.

An extensive community education and awareness campaign needs to be undertaken. This needs to take the form of fostering further involvement of both primary and secondary schools and TAFE Forestech campus. In addition many Landcare groups are aware of the species but may need to become more pro-active in their approach to its management. Other sectors of the community through groups such as Coastcare, Coast Action and Friends groups need to be encouraged to be involved.

The broader community can be informed utilising avenues such as the printed media, local and community radio, community newsletters and signage attached to areas where major efforts are being made to control/manage Bridal Creeper.

4.8 Community Engagement

Communities should be encouraged to be involved in the ongoing management of Bridal Creeper. Participating in biocontrol releases and monitoring are activities in which the community can be engaged.

5. References

Agriculture & Resource Management Council of Australia & New Zealand, Australian & New Zealand Environment & Conservation Council and Forestry Ministers, (2000) *Weeds of national Significance Bridal Creeper (Asparagus asparagoides) Strategic Plan.* National Weeds Strategy Executive Committee, Launceston.

Bate. I, Brown. E, Conway. T, Cornall. R, (2004) *East Gippsland Shire Bridal Creeper Rust Project*. Unpublished.

CRC for Australian Weed Management, (2003) *Weed Management Guide Bridal Creeper (Aparagus asparagoides).* CRC for Australian Weed Management & Department of Environment and Heritage, South Australia.

6. Appendices

6.1 Appendix 1

Bridal Creeper Priority Control Matrix

Bridal Creeper Priority Control Identification Matrix

Site No	% Cover of Bridal Creeper	Vegetation	Chemical Control History	Leafhopper Release	Rust Fungus Release	Accessibility	Satellite Site	Total Score
		Conservation Status		Distance from nearest release site	Distance from nearest release site		Distance from known established infestation	
	< 30 % - 1	Least Concern -1	Never treated - 1	0 – 200 m -1	0 – 200 m -1	Difficult - 1	< 100m - 1	
	30 - 70 % - 2	Rare - 2	Treated once - 2	200 m – 1 km -2	200 m - 1 km -2	Moderate - 2	100 - 500 m - 2	
	> 70 % - 3	Depleted - 3	Treated more than once - 3	> 1 km - 3	> 1km - 3	Easy - 3	> 500 m - 3	
		Vulnerable - 4						
		Endangered - 5						

6.2 Appendix 2

Biocontrol Release Expression of Interest

Department of Primary Industries

Biocontrol Release Expression of Interest

If you are interested in releasing biocontrol agents at a site, please fill this expression of interest form in and send it to us at DPI Frankston, PO Box 48, Frankston VIC 3199. The agreement of cooperation should be signed by whoever is legally responsible for the site.

Weed _____ **Date** _____

Contact Details

Name:
Postal Address:
Site Location:
Phone: Mobile:
Email:
Landcare/friends of/other group membership:
Local DPI, Council, CMA, DSE or Parks Vic contact (if applicable): Contact's role:

Site Details

Property size (ha):
Weed infestation size (ha): Density of weed cover %:
Current control methods:
Land tenure (circle): Private / Crown / Parks Vic / DSE / Council / Other _____
Role on property (circle): Owner / manager / Other _____
Land use (circle more than one): Grazing / cropping / shelter belt / orchard / creek line / roadside / reserve / organic / State Park / National Park / river side / forestry / other_____
Site conditions (circle): Flat / hilly / steep shaded / exposed moist / dry aspect N / E / S / W

Site Location: Please attach a map that would enable someone unfamiliar with the area to find the release site. Include: north point, boundaries, tracks and other distinguishing landmarks. Estimate distances between landmarks.

Please select datum GDA94 on your GPS unit before taking reading.

CFA Map Reference **OR**

Region:
Map No :
Grid ref :
Year of publication:

OR

Map sheet no :
Easting:
Northing:
Datum:

OR

Latitude:
Longitude:
Datum:

How did you find out about the program? _____

What other management activities do you see happening at your site in the next 1-2 years?

_____
_____

What are your long term goals for the site? What would you like it to look like?

_____
_____

What information have you received about biocontrol?_____

_____
_____

Why do you believe biocontrol is important for your site?_____

_____
_____

What do you expect from the introduction of biocontrol agents onto your property?

_____

What (if any) contact have you had with other people who have participated in biocontrol programs?

_____
_____

Do you have any concerns about biocontrol in general or with this program in particular?

_____

Any further comments?

_____
_____

Privacy - Collection of Personal Information

DPI collects only personal information that is necessary for it to manage or administer its functions or services. The information you provide allows accurate recording of biological control releases to be kept. The information you provide may be accessed by Local Council or organisations such as Landcare Groups who may require the location of biological control release sites

Department of Primary Industries

Release of Biological Control Agents
AGREEMENT OF CO-OPERATION

The release of biocontrol agents is being conducted throughout southern Australia in an attempt to aid in the suppression of certain weeds. Biological control will not eradicate the weeds and therefore its use must be integrated with other weed management methods to achieve the desired level of control. This agreement of cooperation must be signed by any land owner/ organisation who is interested in having a biological control release on their property/ or property that they manage. It outlines the responsibilities of DPI and the land manager in having a biological control site on their property. It helps DPI choose responsible, dedicated site managers and ensures the site will be properly maintained and that biological control will not be used as an excuse not to control weeds on the rest of the property.

Responsibilities of the Parties under this Agreement

The Department Of Primary Industries:

- Will supply the biocontrol agents and equipment (i.e. cages, baskets, etc) necessary for the release.
- Will supply literature on the weed, the biocontrol agents being released and how to manage the nursery site.
- Will keep the landowner informed of the progress of the biocontrol project through updates in 'Under Control'.
- May periodically monitor and collect data from the site.
- Will assist in the coordination of the collection of agents for redistribution purposes.

The Landowner:

- Will supply a defined area of land as selected by DPI staff, which may be adjusted from time to time as necessary by mutual agreement.
- Will inform DPI promptly if any problems or difficulties are encountered as a result of the nursery site.
- Will ensure all reasonable precautions are taken to protect the nursery site from physical damage or interference, such as slashing or cultivation.
- Will ensure that if any herbicides or pesticides are to be used on the property, that they are to be kept at a safe distance from the defined nursery site and that precautions should be taken to avoid spray drift on to the nursery site.
- Will not use herbicides within the nursery site and buffer zone areas without prior consultation with DPI project staff.
- Will ensure that any priority weed species (as defined by DPI for that region) within the nursery site/buffer zone area will be controlled by means that will not impact on the biological control agents.
- Will not harvest biocontrol agents from the nursery site without prior consultation with the DPI project staff or Catchment Management Officer.
- Will ensure that DPI is notified if there is to be a change in ownership/management of the release site area.
- Will ensure that weed infestations outside the defined nursery site/buffer zone area are controlled to the specifications of the designated DPI officer.
- Will allow access to the property for DPI staff to monitor and harvest biocontrol agents.
- Will exclude stock from the nursery site area.
- Will not remove cages, tents or shelters from the nursery site unless instructed to by DPI.
- Will resume appropriate weed management methods at the nursery site/buffer zone if directed to by DPI.
- The period of this Agreement is 3 years from the date of the release.

The land manager(s):

I, (name) _____have read the above conditions and am fully aware of my responsibilities in accepting to have a biocontrol agent nursery site located on my property.

Signed:_____ Date:_____

Witness:_____ Date:_____

DPI officer

DPI to complete after release

Biocontrol release details

Release information

Biocontrol agent released:
Date of Release:
Number Released:
Type of Release:
Release conducted by?
Other people attending release?

Source of Agent

Date agents were received/collected:
Where did you collect the agents from? _____ _____ (e.g. redistribution day at ____, received via post from _____, reared through Weed Warriors program at _____ school etc.)

Database

Site number:
Site name:
IPMS Infestation No.:
IPMS Treatment No.:
Region:

6.3 Appendix 3
Selecting a suitable site for biological control

Selecting a suitable site for biological control

You need to select your sites for the release of bridal creeper biological control agents **in advance** so that you can transport them directly to your site and release them on the same day that you receive them. The following are some general criteria that should be followed when choosing a site for bridal creeper biological control. We hope you find them useful when selecting your sites.

Biological control should be considered as part of an integrated weed management plan and not as the only means of control. It is important to think strategically where each control method will be most effectively applied and to remember that other control methods such as spraying may be more appropriate for your area. In general, sites appropriate for biological control:

- **are dense and persistent**
  It is important that you release the agents in an area with a large amount of bridal creeper to enhance their establishment and maximise their capacity to multiply and spread. Hopefully, then, the site may be used for redistribution in a few years, once the agents have become well established there. This will enable us to accelerate the spread of the agents throughout the area and thus achieve the greatest impact in the shortest amount of time.

- **have a long time frame for control**
  The agents may take some time to become established at a release site and to breed up to sufficient numbers to begin causing a real impact on the bridal creeper. If the site is intended for more immediate eradication and/or you have plan to spray the site in the next couple of years then biocontrol is not appropriate.

- **have a low priority for control by other methods**
  Areas can be a low priority for spraying due to financial, practical or environmental constraints. For example, bridal creeper is often found in native bush land in areas with important environmental attributes (such as the presence of an endangered orchid) and spraying would compromise those values. It is these situations where biological control is most valuable.

- **are inaccessible to other control methods**
  Biological control agents often have the mobility which people lack and, as described above, they can work in areas where other control methods are inappropriate.

- **are accessible for monitoring and redistribution purposes**
  This may sound contradictory to the previous criteria. However, in the early stages of the biological control program, regular monitoring can greatly increase the impact of the agents by enabling us to increase our knowledge of how they work and understand what the optimal conditions for their release are. It also lets you know when the agents have become well established and can be actively redistributed to further infestations.

- **are kept free of insecticides and herbicides**
  To ensure that the agent survives, there should be no herbicide used within 50m of a release site. This should not be a problem since the agents should be released in areas where herbicide use is not really an option anyway.

- **have minimal disturbance (eg. by stock grazing, slashing, burning or vandalism)**
  Importing, mass rearing and releasing agents is expensive. Everyone involved in the management of a particular release site (including local government, landowners and local workers) must be fully informed of site requirements to ensure the site is well managed and that the agent is not accidentally wiped out.

6.4 Appendix 4

Rust Fungus Distribution Form

Rust Fungus Distribution Form

DPI staff to complete

Site #:

Name:

Source #:

Bridal Creeper Rust Fungus Redistribution Form

RUST REDISTRIBUTION DETAILS

stems released:

INFORMATION ON NEW RELEASE SITE

Land Tenure (e.g. public, roadside, freehold):

Land Use (e.g. reserve, orchard, backyard):

Property Size (ha):

Area covered by bridal creeper (ha):

Density of bridal creeper (%):

Current/past control methods:

% Canopy Cover:

Prevailing Wind Direction/s (please circle): N NW E SE S SW W NW

ANY OTHER RELEVANT INFORMATION
(e.g. wet/dry/hot/cold on day of release)

Please return completed form to: **Bridal Creeper Project Officer**
DPI Frankston
PO Box 48, Frankston 3199
Fax. 03 9785 2007

IPMS
DPI staff to complete

Region:

Infestation #:

Treatment #:

SITE LOCATION

CFA Map Reference		OR	AMG		OR	GPS Latitude:
Region:			Map Sheet #			
Map No:			Easting:			GPS Longitude:
Grid Ref:			Northing:			

MAP OF RELEASE SITE

Please attach a map with the site marked and/or try to draw a map below which would allow someone unfamiliar with the area to find the site. Include descriptions for how to get there, landmarks that would enable us to find the exact release point (such as trees, sheds, creeks) and a North direction arrow.

6.5 Appendix 5

Rust Fungus Release Procedure

GUIDELINES FOR RELEASE OF THE BRIDAL CREEPER RUST USING WHOLE PLANTS

- Infected bridal creeper plants will be shipped to you without soil.
- Upon receipt, plants should be potted up and left in a glasshouse for a couple of days to settle.
- If the glasshouse conditions are relatively humid and temperature ranged between 16-20°C, masses of spores should be erupting continuously from the pustules, mainly located on the under surface of leaves. If the plants are located in a dry area, you may have to cover them with a plastic bag overnight to stimulate spore eruption from pustules.
- Releases should be made on a rainy/overcast day or at the end of the day (4-5 pm) to avoid hot temperatures if site is exposed to full sun. If the site is in the shade, releases could be made in the middle of the day to take advantage of the warmer winter temperatures. **Infection of plants by the rust is optimum at cool temperatures (16-20°C) in a humid environment for about 16 h.**
- Inoculation of plants is performed by 'rubbing' the foliage of infected plants onto healthy foliage in the field. This is achieved by sliding back and forth the infected foliage within the foliage of plants in the field to dislodge spores from pustules and allow their deposition on the under surface of leaves. It is important to realise that the rust infects via stomata which are located on the **under** surface of leaves and stems.
- We recommend you use two infected plants to inoculate a 1-2 m^2 area (on the ground) infested with bridal creeper or the equivalent amount of foliage climbing up a bush or tree (we believe the latter is the ideal option to facilitate spread). After inoculation, if it is not a rainy day, mist inoculated field plants with water and cover the area with a sheet of clear plastic held in place with sticky tape, rocks or pegs, to provide a humid environment for 16-24 h or overnight. If the site is in full sun, the plastic sheet should be removed the next morning to prevent plants heating up.
- Under optimum temperature (approx. 20°C), the first signs of infection on plants appear as tiny yellow flecking at about 15 days after inoculation. It is possible that in the field the first signs of infection will take slightly longer to appear (up to 3-4 weeks).

6.6 Appendix 6
Rust Fungus Monitoring Form

Rust Fungus Monitoring Form

RUST FUNGUS MONITORING FORM

Please fill this form out once a year in September/October and send it in to the Bridal Creeper Project Officer, DPI Frankston, PO Box 48, Frankston VIC 3199.

SITE DETAILS

Site Location: _____

Name of person monitoring: _____

Phone Number: _____ Email: _____

Date: _____ Time: _____

Weather conditions: (please circle) hot / mild / cold AND wet / dry

General site conditions: (please circle) dry / damp AND shaded / exposed

PART A – RUST FUNGUS

Search for approximately 10 minutes in your area for rust fungus damage. Start at the release point if possible and work your way out from there. If you are not sure what the rust fungus looks like, please contact us on (03) 9785 0111.

1. Is the rust fungus still present at your site? (please circle) YES / NO

If no, please go to question 10.

2. Which forms of rust fungus can you see at your site? (please tick)

- ☐ Yellow flecking - no risen bits on under surface of the leaf, the rust has just begun to appear
- ☐ Pale yellow pustules - yellow spots on upper surface and tiny bumps underneath
- ☐ Orange pustules – larger orange spots on upper surface and orange bumps underneath – rust will look like this for the rest of the season until the bridal creeper dies back)
- ☐ Black marks (over summering stage of the rust, may be observed at the very end or beginning of the season)

3. Which of the following best describes the rust fungus damage observed at the site? (please tick)

- ☐ damage just detectable
- ☐ low level damage
- ☐ medium level damage
- ☐ severe level damage

4. Do you know where the rust fungus was originally released? YES / NO

If no, please go straight to Question 7.

5. What is the release site marked with (please circle): stakes / flagging tape / sign?

6. How far has the rust fungus spread from your original release point? (in metres)

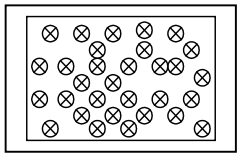
North:_____ South:_____ East:_____
West:_____

If your site is too inaccessible to monitor accurately, please estimate distances as best you can and then tick this box ☐.

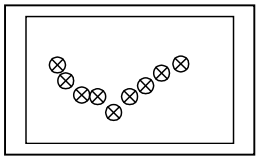
7. What is the total area affected by the rust fungus?

Length_____(m) x Width_____(m) = _____ m^2

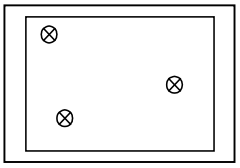
8. In what way has the rust fungus spread through your site? (circle one option below)



Dense
(rust everywhere)



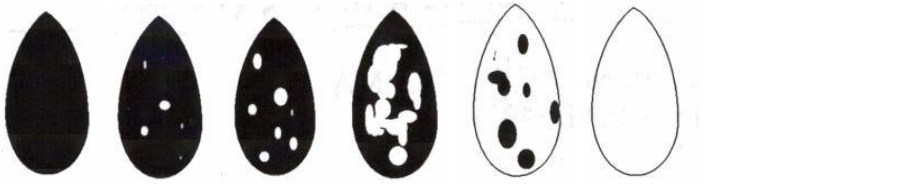
Linear
(rust along animal/walking tracks/gullies)



Scattered
(rust in patches)

9. Using the leaf damage score chart below, estimate the average coverage of rust within a $1m^2$, $5m^2$, $10m^2$, $20m^2$ and $50m^2$ and $100m^2$ area surrounding your original release point.

Leaf Damage Score Chart



Black area represents green leaf colour. White area indicates amount of rust fungus damage.

Area surrounding release point (m)	Bridal creeper present (YES/NO)	Average rust fungus 'leaf damage score'
1m^2		
5m^2		
10m^2		
20m^2		
50m^2		
100m^2		

PART B – CONTROL OF BRIDAL CREEPER

10. Take a photo of the release point, for easy visual comparison of the site over time.
Try to take the photo in exactly the same direction each year.

11. Within a 5 m radius around your release point, what percentage of the ground does the bridal creeper cover? (please tick one)

☐ 0 - 20 %
☐ 20 - 40 %
☐ 40 - 60 %
☐ 60 - 80 %
☐ 80–100%

12. What is the maximum height that the bridal creeper grows to within this 5 m radius area and what type of vegetation (e.g. tree or shrub) or plant species is it growing on?

Height: metres
Vegetation type or plant species:

13. Do you believe the bridal creeper infestation has increased, decreased or remained the same since you released the rust fungus? (please circle one)

INCREASED / DECREASED / THE SAME

14. Have any other bridal creeper control methods been used to control bridal creeper in the area? (please tick)

☐ Chemical ☐ Manual ☐ Mechanical ☐ Other……..

15. Are there any other factors that may have affected the rust fungus or release site? (please tick)

☐ Flood ☐ Fire ☐ Weedicide ☐ Fungicide ☐ Vandalisation ☐ Other…..

16. How do you feel the rust fungus is going so far? (please circle)

Not well established / poorly / reasonably / well / excellent

Please comment:_____
_____

17. Why do your believe biocontrol is important for your site?_____
_____

18. How do you think biocontrol will contribute to the management of weeds in your area?_____

---

19. What recommendations would you make for future work to be done at your site? (e.g. chemical control, additional biocontrol releases, revegetation etc.).

_____
_____
_____

20. Are you interested in being involved with the release of future biological control agents (please circle) YES / NO

Please comment on why/why not: _____
_____
_____
_____

21. How much contact have you had with others participating in this or other biocontrol programs?

None / a small amount / some / a lot

If so,
who?_____

22. How many people have you spoken to about, or shown, your biocontrol site?

None / a small amount / some / a lot

If so, who? (e.g. neighbours, friends, groups you're involved with etc.)

_____

23. Have you, or anyone you know, redistributed rust to any other bridal creeper infested locations? (please circle) YES / NO

If not yourself, who? _____

24. Have you received enough information / skills / training for you to be able to carry on the project on your own for the next 5-10 years? YES / NO

What have you found most useful from the program?_____
_____

What else would you find useful?_____

25. What are your general perceptions of biological control? (e.g. any concerns, is it effective?) _____

---

26. Any further comments?_____
_____
_____

Your help is very much appreciated!

6.7 Appendix 7
Leafhopper Monitoring Form

Leafhopper Monitoring Form

LEAFHOPPER monitoring form

Please fill this form out once a year in September/October and send it in to the Bridal Creeper Project Officer, DPI Frankston, PO Box 48, Frankston VIC 3199.

SITE DETAILS

Site Location: _____

Name of person monitoring: _____

Phone Number: _____ Email: _____

Date: _____ Time: _____

Weather conditions: (please circle) hot / mild / cold AND wet / dry

General site conditions: (please circle) dry / damp AND shaded / exposed

Prevailing wind direction/s: (please circle) North / NE / East / SE / South / SW / West / NW

PART A – LEAFHOPPERS

Search for approximately 10 minutes in your area for leafhopper damage. Start at the release point if possible and work your way out from there. If you are not sure what the leafhoppers look like, please contact us on (03) 9785 0111.

1. **Are leafhoppers still present at your site? (please circle)** YES / NO

   If no, please go to question 10.

2. **Which life stages of the leafhoppers can you see at your site? (please tick)**

   ☐ Adults (cream/yellow colour; move your finger near them and they will fly away)

   ☐ Nymphs (similar to adults but cannot fly and are smaller than the adults)

   ☐ Eggs (inserted into the under surface of leaf – pale yellow and oval shaped – unlikely to see without microscope)

3. **Which of the following best describes the leafhopper damage observed at the site? (please tick)**

   ☐ damage just detectable ☐ medium level damage

   ☐ low level damage ☐ severe level damage

4. **Do you know where the leafhoppers were originally released?** YES / NO
   If no, please go straight to Question 7.

5. **What is the release site marked with (please circle):** stakes / flagging tape / sign?

6. **How far have the leafhoppers spread from your original release point?**

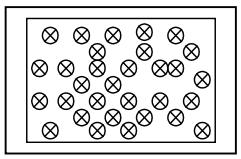
   _____ m

7. What is the total area affected by leafhoppers?

Length_____(m) x Width_____(m) = _____ m^2

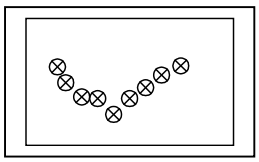
8. In what way have the leafhoppers spread through your site? (circle one option)

Dense



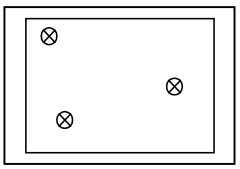
(hoppers everywhere)

Linear



(along animal/walking tracks/gullies)

Scattered



(seen in patches)

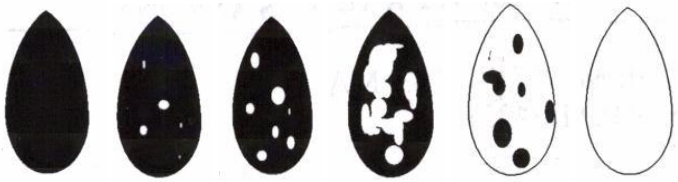
9. Starting at your original release point, walk in a straight line in a direction of leafhopper damage. At each of the distances marked in the table below, record:

- **the presence/absence of bridal creeper and**
- **when bridal creeper is present, the average 'leaf damage score' of the leafhoppers within a $1m^2$ area directly below you.**

Permanently record the location of your starting point and direction of your line on a map, so you can walk exactly the same line each year.

Note: If you confront an obstacle, just walk around it, estimate the distance you have missed, and continue your walk on the other side. You may estimate the distances by taking large steps approximately 1m wide.

Leaf Damage Score Chart



0% 20% 40% 60% 80% 100%

Black area represents green leaf colour. White area indicates amount of leafhopper damage.

Distance from release point (m)	Bridal creeper present (YES/NO)	Leafhopper 'leaf damage score' within $1m^2$ area
0 m		
2 m		
4 m		
6 m		
8 m		
10 m		
20 m		
30 m		
40 m		
50 m		
70 m		
100 m		

PART B – CONTROL OF BRIDAL CREEPER

10. Take a photo of the release point, for easy visual comparison of the site over time.
Try to take the photo in exactly the same direction each year.

11. Within a 5 m radius around your release point, what percentage of the ground does the bridal creeper cover? (please tick one)

- ☐ 0 - 20 %
- ☐ 20 - 40 %
- ☐ 40 - 60 %
- ☐ 60 - 80 %
- ☐ 80–100%

12. What is the maximum height that the bridal creeper grows to within this 5 m radius area and what type of vegetation (e.g. tree or shrub) or plant species is it growing on?

Height: metres
Vegetation type or plant species:

13. Do you believe the bridal creeper infestation has increased, decreased or remained the same since you released the leafhoppers? (please circle one)

INCREASED / DECREASED / THE SAME

14. Have any other bridal creeper control methods been used to control bridal creeper in the area? (please tick)

- ☐ Chemical
- ☐ Manual
- ☐ Mechanical
- ☐ Other……..

15. Are there any other factors that may have affected the leafhoppers or release site? (please tick)

- ☐ Flood
- ☐ Fire
- ☐ Drought
- ☐ Vandalisation
- ☐ Weedicide
- ☐ Fungicide
- ☐ Other …….

…….

16. What recommendations would you make for future work to be done at your site? (e.g. chemical control, additional biocontrol releases, revegetation etc.).

_____

_____

_____

_____

17. Are you interested in being involved with the release of future biological control agents (please circle) **YES / NO**

Please explain your answer:_____

---

18. ANY FURTHER COMMENTS?
(E.G. WHAT ARE YOUR GENERAL PERCEPTIONS OF BIOCONTROL/ EFFECTIVENESS OF THE LEAFHOPPERS?)

_____

_____

_____

_____

_____

19. Have you, or anyone you know, redistributed leafhoppers to any other bridal creeper infested locations? (please circle) YES / NO

If yes, please fill out a leafhopper redistribution form for each new site established if possible and return them with this monitoring form.

Your help is very much appreciated!
Please return the completed form to:
Bridal Creeper Project Officer
DPI Frankston
PO Box 48 Frankston VIC 3199

6.8 Appendix 8

Property/Site Bridal Creeper Management Action Plan

Property/Site Bridal Creeper Management Action Plan

Vision

To reduce Bridal Creeper by 70% by the year 2015

Action Statement
This will be achieved by

Introduction

Background

Past Management History

Current Status

Priority Infestations
Zoning
Mapping

Objectives and Strategies

Responsibilities

Key Stakeholders

6.9 Appendix 9
Local Area Bridal Creeper Management Plan

Local Area Bridal Creeper Management Plan

Vision

To reduce Bridal Creeper in the area of _____ by 70% by the year 2015

Action Statement
This will be achieved by

Introduction

Background

Past Management History

Current Status

Priority Infestations
Zoning
Mapping

Objectives and Strategies

Responsibilities

Key Stakeholders

6.10 Appendix 10

Biocontrol Releases 1999 – 2005