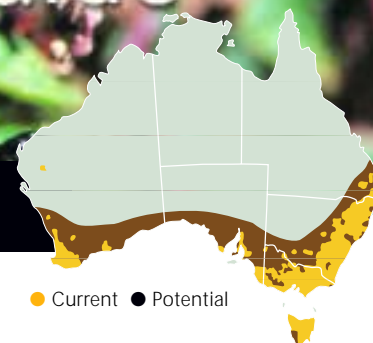


Weed Management Guide

Blackberry –
Rubus fruticosus aggregate



Blackberry (*Rubus fruticosus aggregate*)

The problem

Blackberry is a *Weed of National Significance*. It is regarded as one of the worst weeds in Australia because of its invasiveness, potential for spread, and economic and environmental impacts.

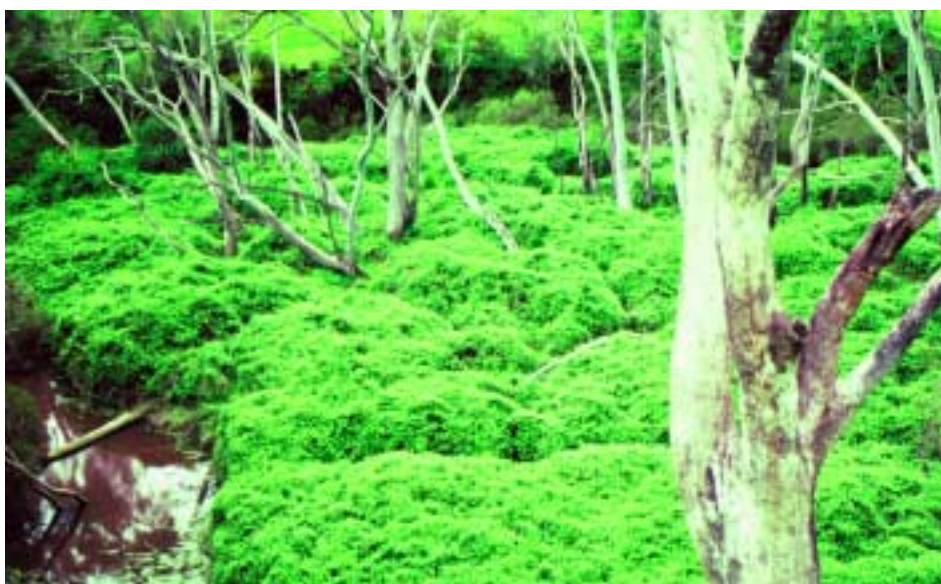
Blackberry has invaded the banks of watercourses, roadsides, pastures, orchards, plantations, forests and bushland throughout temperate Australia. On farms blackberries reduce pasture production, restrict access to water and land, and provide food and shelter for pest animals such as foxes. In some cases the cost of plantation forestry may be increased, especially during establishment, because blackberries impede access for manual operations.

Other impacts are increased fire hazards caused by the large amount of dead material present in blackberry thickets and a substantial decrease in property values where heavy infestations occur. Control costs are often high.

Weeds such as blackberries also affect tourism, reducing the natural attraction of the bush and hindering recreational activities where thickets prevent access to natural features.

The weed

The name 'blackberry' covers at least 14 different but closely related species, some of which may be hybrids, that have become naturalised in Australia.



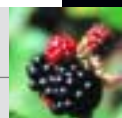
Blackberries hinder recreational activities by preventing access to natural features: Loddon River in central Vic.
Photo: Kate Blood

Blackberry is a perennial, semi-deciduous shrub with prickly stems (canes) that take root where they touch the ground, often forming thickets up to several metres high. It varies from sprawling to almost erect. The stems, which grow up to 7 m long, may be green, purplish or red, and are generally thorny and moderately hairy. Young canes emerge from buds on the woody root crown each spring and grow very rapidly (50–80 mm a day). Leaves are usually dark green on top with a lighter green underside. The leaf veins and stalks are covered with short prickles. Clusters of flowers are white or pink.

The berries change colour from green to red to black as they ripen. The plant is semi-deciduous and sheds its leaves in winter.

Key points

- At least 14 different but closely related species of blackberry are naturalised in Australia.
- Some species could spread further within the climatic limits of blackberry's range.
- Blackberry management programs must be planned and sustained over a number of years.
- Biological control will not eradicate blackberry, but will slow the rate of spread and allow more time for control by other means. Rust has been the most successful biocontrol so far.
- In revegetation programs, native seedlings that are able to germinate and actively grow over winter have a competitive advantage.

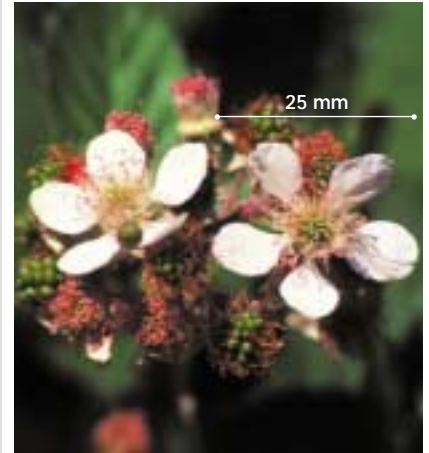


Growth calendar

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
New canes												
Flowering												
Fruiting												
New plants												
Germination												

■ General growth pattern

Blackberry has a two-year growth pattern. Young canes start growing in spring, flowering occurs from late November to late February and fruiting from late December to April. New (daughter) plants develop at the tips of first-year canes throughout autumn and winter. Most germination takes place during spring and early summer.



Blackberry plants produce clusters of white or pink flowers.
Photo: Kate Blood

How it spreads

One berry may contain as many as 80 seeds which are easily spread by birds, mammals (especially foxes) and water. Bushwalkers and other recreational users can also spread seeds, as can moving soil from one place to another. Blackberry roots can be spread to clean areas by cultivation.

Blackberry will persist indefinitely in an area unless it is treated. Plants that die are replaced by seedlings or daughter plants produced by nearby individuals. Plants may produce up to 13,000 seeds per square metre.

Where it grows

About 8.8 million ha of Australia is infested with blackberry, which thrives in a wide range of habitats. It can dominate



Berries change colour from green to red to black as they ripen.
Photo: Kate Blood

pastures and native ecosystems as well as invade disturbed sites in urban areas. In badly affected areas, dense infestations often fill whole gullies and can extend for a width of tens of metres along both sides of streams.

The plant is restricted to temperate climates with an annual rainfall of at least 700 mm, and can occur at any altitude in Australia. Blackberry plants grow above the snowline in Victoria at about 1950 m altitude.

Potential distribution

Blackberry has probably reached the climatic limits (in terms of temperature and rainfall) of its potential range in Australia. However, individual species may spread further within these climatic limits. A few scattered infestations exist outside of the projected range under ideal conditions in Western Australia.



Blackberry bushes often form thickets up to several metres high.
Photo: John Hosking

What to do about it

The major challenges in managing blackberry are to prevent its spread, control and reduce existing infestations, and rehabilitate treated areas to prevent reinfestation.

In its long history as a noxious weed, blackberry has been managed by a range of control techniques, including burning, slashing, grazing, grubbing, chemical spraying and biological control.

Blackberry management programs must be planned and sustained over a number of years to prevent the rapid return of the infestation.

Apply herbicides to healthy plants

In general, the best time to spray blackberry is during the flowering–fruiting period, but the effective spraying season can start before flowering and extend long after fruiting, into autumn.

It is easy to kill young blackberry seedlings with herbicide. However, well established blackberry thickets have a large number of root crowns of different ages, and the older and bigger ones are usually hard to kill.

If using herbicides taken up by the leaves, avoid slashing in the season before application; it can reduce the effectiveness since only the new canes will be available to take up the herbicide.



The prickly stems, known as canes, may grow up to 7 m long. The leaves are usually dark green on top with a lighter green underside.

Photo: John Hosking

Do not apply herbicides to stressed plants. Conditions such as drought or severe low or high temperatures can decrease the effectiveness of herbicide action. As a guide, look at the tips of the canes. In times of active growth (the best time to spray) these will be producing fresh new leaves, and any new growth should be healthy, not wilted.

The success of herbicide treatment can also vary between the different groups of blackberry. Some produce fewer crowns per square metre than others and fewer canes per crown. Other features such as larger leaves and canes and hairier leaf surfaces (which may reduce absorption) can also affect herbicide uptake.

Methods of herbicide application

High-volume spraying is recommended for spot spraying, particularly in dense infestations or large blackberry thickets. If using this method, spray the inside of bushes first, ensuring good coverage of stems and leaves. Then spray outside leaves, runners and tips. Take particular care with this method because it is very easy to overdose and affect off-target species or contaminate waterways. Likewise, mist blowers or air blast sprayers can be effective but allow little control over spray distribution due to spray drift. None of these methods are suitable for use near susceptible native species.

In remote areas where water for herbicide application is not available, pellets or granular herbicides can be effective. These are applied to the soil surface and the chemical is leached by rain into the root zone where the roots take it up. This method is not suitable for use near native vegetation. Results of some trials have shown that slashing before application of granular herbicide gives better results than using granules alone.

The use of a gas-powered gun has been suggested as a method which enables very accurate application of herbicide onto target plants. It can be used to control scattered blackberries to a height of 1.5 m. Knapsack units are most suitable for spraying small scattered bushes and seedlings.

For small areas of high conservation significance, the 'cut and paint' method is recommended. This involves cutting blackberry canes close to ground level and immediately painting cut stems with herbicide. However, it should be used only on small plants and retreatment is likely to be necessary.

Slashing will not kill blackberry

Although cutting blackberry plants off at ground level does not kill them, slashing can help open up dense stands for follow-up control by other methods.

Regular (fortnightly or monthly) slashing or mowing forces the plant to regrow, using up root reserves and making it weaker. Slashing in summer can enhance the effect of blackberry leaf rust because regrowth stimulated by the slashing is very susceptible to the rust fungus.

Hand weeding

This is only effective in very small infestations. Even seedlings and small plants are difficult to pull out by hand. If possible, all of the root system should be removed using a mattock or shovel because blackberry will regrow from any root fragments left in the soil.

Dense infestations may require mechanical control

In dense infestations mechanised weeding with large earthmoving equipment may sometimes be necessary. Remove plants and surface soil with a bulldozer ('scalping') to ensure crowns and most of the roots are dug out. Afterwards, rake roots and leave them to dry out in the sun or collect them in piles for burning. Regrowth from crowns, root fragments and seed is inevitable, so follow-up treatment and site rehabilitation are essential.

Grazing with goats

Goats at high stocking rate can be used to control blackberry in pasture but their use must be continuous to prevent regrowth occurring.



Regrowth is inevitable after mechanical removal so follow-up treatment is necessary.
Photo: Ian Walton, DPI Vic

Weed control contacts

State / Territory	Department	Phone	Email	Website
ACT	Environment ACT	(02) 6207 9777	EnvironmentACT@act.gov.au	www.environment.act.gov.au
NSW	NSW Agriculture	1800 680 244	weeds@agric.nsw.gov.au	www.agric.nsw.gov.au
Qld	Dept of Natural Resources and Mines	(07) 3896 3111	enquiries@nrm.qld.gov.au	www.nrm.qld.gov.au
SA	Dept of Water, Land and Biodiversity Conservation	(08) 8303 9500	apc@saugov.sa.gov.au	www.dwlbc.sa.gov.au
Tas	Dept of Primary Industries, Water and Environment	1300 368 550	Weeds.Enquiries@dpiwe.tas.gov.a	www.dpiwe.tas.gov.au
Vic	Dept of Primary Industries/Dept of Sustainability and Environment	136 186	customer.service@dpi.vic.gov.au	www.dpi.vic.gov.au www.dse.vic.gov.au
WA	Dept of Agriculture	(08) 9368 3333	enquiries@agric.wa.gov.au	www.agric.wa.gov.au
Australia wide	Australian Pesticides and Veterinary Medicines Authority	(02) 6272 5852	contact@apvma.gov.au	www.apvma.gov.au

For up-to-date information on which herbicides are registered to control blackberry and the best application methods and dosages, contact your state or territory weed management agency or local council. This information varies from state to state and from time to time. Contact details are listed above, including contacts for the Australian Pesticides and Veterinary Medicines Authority, which hosts the PUBCRIS database. This database contains information on all herbicides that are registered for use on weeds in each Australian state and territory.

When using herbicides always read the label and follow instructions carefully. Particular care should be taken when using herbicides near waterways because rainfall running off the land into waterways can carry herbicides with it. Permits from state or territory Environment Protection Authorities may be required if herbicides are to be sprayed on riverbanks.

Biological control with the blackberry leaf rust

The program with the greatest likelihood of success in the foreseeable future includes biological control, particularly on large, inaccessible infestations of blackberry. The blackberry leaf rust *Phragmidium violaceum*, which attacks the leaves, is now present throughout all areas of southern Australia where blackberries are a problem. It affects the leaves and can also grow on flowers, unripe fruit and young canes. The rust is harmless to native *Rubus* species and varieties of commercial raspberry and brambleberry such as loganberry, boysenberry and youngberry. The rust alone will not eradicate blackberry but it slows its rate of spread and allows more time for control by other means.

The rust appears as purple-brown blotches, 2–3 mm in diameter, on the upper surface of the leaf. Corresponding powdery yellow or sticky black pustules of spores appear on the leaf's lower surface.

Epidemics of rust caused by summer spores initially kill leaves in summer and autumn, forcing the plants to grow new leaves, which in turn are attacked by the rust. Rust epidemics result in fewer fruit

and seeds, shorter canes and fewer new plants.

This continuous attack on the leaves weakens plants by depleting root reserves. Light can start penetrating the thicket, which helps revegetation by other plants, especially in autumn and winter. Competing plants can then grow through the blackberry and in turn limit its growth by shading.

The blackberry rust has been so effective in the Gippsland region of Victoria that farmers complained about having to re-do their fencing when blackberry hedges fell down! However, the rust seems to be severe only in regions where the annual rainfall is greater than 800 mm and the average daily maximum temperature for January is close to 20°C.

Different blackberry species vary in their susceptibility to the rust, from very susceptible to highly tolerant. The effectiveness also varies between years, according to seasonal conditions. A sufficiently high level of infection is not always present early enough to prevent seed production and tip rooting of canes. Although the rust has had a big impact on the more common and widespread blackberry strains, some less widespread groups



Slashing can help open up dense stands of blackberry for follow-up control by other methods. Photo: Adam Whitchurch, DPI Vic

are resistant, giving them an advantage, and resulting in their gradual takeover and a continuation of the overall blackberry problem.

Blackberry control strategies must address all the strains present in a region. Management actions which target only some of the species will result in one strain replacing another, with no net decrease in blackberry cover. For example, while the blackberry leaf rust is successfully controlling one species in the Strzelecki Ranges of Victoria, another rust resistant group is rapidly spreading to fill the niche.



To address this issue, additional rust strains are being tested in CSIRO's quarantine facility in Canberra before their expected release throughout Australia during 2003–04. Matching virulent rust strains to susceptible blackberry species is essential for successful biological control. Just as important are suitable weather and blackberry growing conditions for development of rust disease.

Although rust epidemics can look spectacular, blackberry is a very vigorous plant and can survive repeated attacks over a number of years before its root system begins to be depleted. It can take up to five years of rust infection for large well-established blackberry infestations to open up enough to allow other plants to grow through.

Integrated control

Blackberry should be inspected during summer–autumn and herbicide treatment planned for any infestations that are not attacked heavily by rust. Research has shown that spraying herbicides after the rust has killed some leaves gives equal or better control than application earlier in the season.

Where rust is having little impact, the use of herbicides is usually necessary since mature blackberry is able to regenerate readily from roots following burning or slashing.

Use of competitive native species

Maintaining good quality groundcover can help control blackberry seedlings. If rapid regeneration of fast-growing native species can be achieved, these can out-shade seedlings and outcompete them for water and nutrients. Blackberry roots do not develop much over winter so native seedlings able to germinate and actively grow during this period will have a definite competitive advantage.



The blackberry rust appears as purple-brown blotches on the upper leaf (*left*) and powdery yellow or sticky black pustules of spores on the lower surface (*right*).
Photo: John Hosking

Careful use of prescribed fire

This is used mainly as a follow-up to herbicide application to clear areas of dead canes and re-establish access for rehabilitation of the treated area.

Follow-up

Once an area has been treated it will be necessary to monitor it for many years and destroy new plants.

Legislation

Blackberry is declared noxious in all states and territories except the Northern Territory. Landowners are required to control it. Check with your local council or state/territory government agency about its requirements for blackberry control.

Acknowledgments

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Maps: Australian Weeds Committee.

...case study

Keeping Western Australia's Porongurup National Park blackberry free

In Western Australia's Porongurup National Park an integrated approach has been adopted to tackle blackberries, involving government departments, landholders and volunteer groups.

The aim of the program, which is targeting satellite infestations on the northeastern edge of the park, is to move the blackberry front 20 km away from the park. This involves controlling infestations both on farms (to stop them entering the park) and in the park (to stop them spreading to farmland).

Agriculture WA provides herbicide to landholders, who contribute the labour.

"While from an individual point of view, there may not be a great incentive to get rid of blackberries, the community is proud of the park, and neighbours will put pressure on each other to clear up infestations", says coordinator of the program, John Moore of Agriculture WA.

The program runs training days and equipment is available for loan. The landowners include hobby farmers with small holdings where infestations are too large to tackle using hand-held equipment.

The program includes a number of approaches, including the use of specific herbicides for large infestations, which are different from herbicides used in

gardens, vineyards and other sensitive areas. Some people don't want to use herbicides at all so they may be using other techniques such as mowing, cultivation, burning or grazing with goats before seed sets.

Landholders can see the impact of blackberries and where they have been controlled in the park. For example, in some unsprayed areas tall karri (*Eucalyptus diversicolor*) trees rise through the blackberries, which dominate the undergrowth. In comparison, native grasses and understorey plants are growing in some sprayed areas where all blackberries and a small amount of native vegetation have been killed.



How to control blackberry

Quick reference guide

Prevention

Keep uninfested areas clear of blackberry and remove isolated plants before they have a chance to seed.

Herbicide control

Consult a specialist for advice on registered herbicides in your state or territory (see the contacts table on p. 4). Apply herbicide to actively growing plants – look at the tips of the canes and spray when they are producing fresh new leaves.

Physical control

Slashing can help open up dense stands for follow-up control by other methods, and in summer can enhance the effect of blackberry leaf rust.

Mechanical control is difficult and most of the root system must be removed for effective control – blackberry will regrow from any root fragments left in the soil. In dense infestations bulldozers may be used to remove plants but follow-up treatment is essential.

Biological control

Biological control offers the greatest likelihood for success in large, inaccessible infestations. The existence of at least 14 different groups or strains of blackberry in Australia makes biological control difficult as some groups are more susceptible to the blackberry leaf rust than others.

Rust fungi have established well in some high rainfall areas but have failed to have an impact elsewhere. Additional rust strains are being tested in quarantine and are expected to be released in 2003–04.



Blackberries are easily spread by birds, mammals and water.
Photo: Kate Blood



The blackberry rust is most effective during late summer and autumn in cool, moist environments such as Gippsland, Vic.
Photo: El Bruzzese, DPI Vic

Control options

Control option	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Herbicide application	✓	✓	✓	✓					✓	✓	✓	✓
Mechanical removal (incl. grazing)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Burning			✓	✓	✓	✓	✓	✓	✓	✓		
Biological control (release rust)	✓										✓	✓

✓ Optimum times for blackberry control methods

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