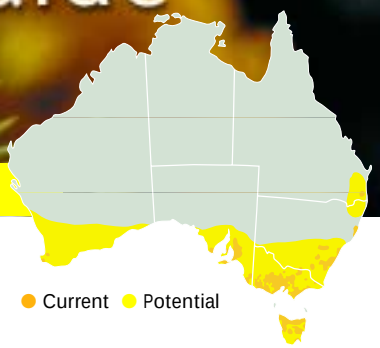
# Weed Management Guide

**Gorse** – *Ulex europaeus*




# Gorse (*Ulex europaeus*)

## The problem

Gorse 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. It is a major agricultural weed in Tasmania and parts of Victoria, and is increasingly becoming a threat as an environmental weed in many national parks and other bushland areas.

In pastoral areas it provides shelter for pests such as rabbits, increases the risk of bushfires because of its flammability, reduces access by forming dense thickets and dramatically reduces stocking rates.

In Tasmania the cost of gorse to the state's woolgrowers in lost production alone has been conservatively estimated at about $1 million annually. In Victoria the costs of gorse to the community in the central highlands region were recently estimated at $7 million over five years.

Control of gorse, like all weeds, requires persistence, with initial costs of between $200 and $1000 per ha and requires ongoing follow-up treatment of seedlings.

## The weed

Gorse is a prickly, perennial, evergreen legume which, if left undisturbed, will grow to a height of more than 3 m. It produces deep and extensive roots. All its stems and leaves are prickly, ending in a sharp spine. The plant produces huge numbers of brown to black seeds in grey hairy pods, each pod holding three or four seeds. The seeds have a hard, water-resistant coating which allows them to remain dormant in the soil for up to 30 years.

The small dark green leaves are stiff and covered with a waxy coat, which helps reduce water loss. Together with its deep root system, this feature enables gorse to flourish in areas with very low rainfall.

The bush is covered with bright yellow, pea-like flowers. In spring it is one of the first species to flower, and beekeepers believe it is an important source of pollen.

Gorse invades pastures and reduces primary production, often in association with other weeds such as Montpellier broom (*Genista monspessulana*): Smythesdale, Vic.
Photo: Kate Blood

## Key points

- Prevention is the most cost-effective means of weed control.
- The key to controlling the spread of gorse is to prevent flowering or at least reduce its ability to set seed.
- Where gorse crosses property boundaries, any eradication efforts should be coordinated with neighbouring landholders to completely destroy all plants in the area and prevent reinfestation.
- Tackle the small, outlying infestations first. This allows a bigger area of land to be cleaned up first and there will be less follow-up maintenance in these areas as the seedbank will be smaller.

Natural Heritage Trust
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## Growth calendar

Gorse bushes first start flowering when they are about 18 months old. Flowers can be produced at almost all times of the year but usually appear in two distinct periods – spring and autumn. In cool climates gorse may flower only once a year but flowers may be present on some bushes at other times under the right conditions. Seeds are usually released in hot or dry conditions and can be stimulated into germination following burning or mechanical disturbance. Individual gorse bushes can live to a maximum age of about 30 years.

## How it spreads

A mature infestation can produce up to 6 million seeds per ha each year. Most seeds fall around the plant but the pods can split open and shoot seeds for a distance of up to 5 m. In this way gorse infestations spread rapidly, particularly when growing along water courses.

Gorse can spread into new areas from seed movement in water, soil, machinery and footwear. Birds and ants are also known to spread the seeds. While it is mainly spread by seed, cultivation and the spread of the root system can permit some plant fragments to regenerate.

## Where it grows

Gorse is a native of Europe and the United Kingdom. Introduced to Australia as a hedge plant in the early 1800s, it quickly spread out of control. It now occurs in all states and territories except the Northern Territory but it is more of a problem in Tasmania and southern Victoria than anywhere else in Australia.

Gorse usually grows where rainfall is evenly distributed throughout the year and in the range 650–900 mm. However, it is very adaptable and dense infestations occur along Tasmania's west coast where the mean annual rainfall is more than 2400 mm. It grows very well on fertile soils as well as on light sands, heavy clays and disturbed soils.

In mainland states gorse grows mainly along riverbanks, roadsides and other non-agricultural areas such as rail lines, quarries and mine sites. In Tasmania and parts of Victoria it is also a major pasture weed. In Tasmania gorse has rendered many hectares of land in the Midlands unsuitable for grazing.

Small gorse infestations occur in the ACT, southeastern Queensland and Western Australia. In New South Wales it is a major problem in national parks and reserves in the southeastern region and in the Blue Mountains. In South Australia it is restricted to higher rainfall areas and is found mainly in the Fleurieu Peninsula, Adelaide Hills and Clare Valley.

## Potential distribution

Based on climate suitability, gorse could potentially spread well beyond its current range. It could infest most of coastal southern Australia, including the whole of Tasmania, Victoria and the Australian Capital Territory, and most of southern South Australia. The relatively small Queensland infestation could also expand its range throughout the cooler, higher rainfall areas.


Gorse bushes are typically found up to 3 m tall and can flower year round under the right conditions.
Photo: Eric Coombs, Oregon (USA) Dept of Agriculture


Gorse produces prolific numbers of seeds, up to 6 million per ha each year.
Photo: John Virtue, DWLBC

## What to do about it

Once gorse becomes established, it is very difficult to eradicate. The key to controlling its spread is to prevent flowering or at least reduce its ability to set seed.

Control programs require a minimum of five years commitment, including yearly site inspections and follow-up treatment of all seedlings, which is likely to increase control costs several-fold.

### Apply herbicides during periods of active growth

Herbicides can be effectively applied, either directly to leaves when plants are at least 500 mm high or painted onto cut stumps. There are a number of registered chemicals and they work best if applied when plants are actively growing (during spring to early summer and after autumn rain). In dense stands you may need to clear access paths to get complete coverage.

Do not apply sprays when plants are in full flower or when bees are active.

Check treated bushes 12 months after herbicide application and treat any regrowth.

In wasteland areas herbicides are often the only practical method, together with encouragement of native species regrowth.

In the cut-stump technique, herbicides are painted immediately once the stem is cut as low to the ground as possible. A dye mixed with the herbicide can be useful as a marker.
Photo: Greening Australia, Tas

## Cut-stump treatment

Cut stems of bushes as low as possible and paint stumps with a herbicide solution to prevent regrowth. This method is particularly useful where spraying herbicide may cause damage to desirable plants or to water near riverbanks. The herbicide solution must be applied immediately after the top growth is removed before the stump seals up. If it is not applied quickly enough, the chemical will not be fully absorbed and regrowth will probably occur.

## Sheep and goats will graze gorse

Grazing by sheep is moderately effective for controlling gorse seedlings before spines are formed but high stocking rates are needed to force sheep to graze on gorse rather than other pasture species.

After a dense gorse infestation has been removed and a pasture established, periodic heavy grazing by sheep during spring and summer can prevent the re-establishment of gorse seedlings. Grazing needs to be carefully managed to avoid overgrazing and subsequent pasture damage.

Goats are excellent as they prefer to eat young gorse shoots rather than graze actively growing pasture. They eat the flowers and strip the bushes, browsing them back to stumps under high stocking rates. Unfortunately, well-established gorse bushes are not easily killed by browsing and can recover, even after several years, if the goats are removed. Tasmanian trials have shown that angora goats are ideal. Gorse is moderately nutritious and they will produce reasonable yields of mohair while browsing it. The suggested strategy is to burn the gorse bushes immediately before stock are introduced.

## Burning

Burning is often carried out in combination with grazing. It reduces the amount of leaves and stems and stimulates growth of soft green shoots, which are initially spineless and more palatable to stock.

Fire can also be useful in reducing dense thickets of gorse to ground level to allow follow-up spraying of regrowth. It will stimulate seed germination, allowing more seedlings to be sprayed the following year and reducing the seedbank.


The bright yellow, pea-like flowers are mainly pollinated by bees.
Photo: John Virtue, DWLBC

However, because it stimulates seed growth but at the same time destroys much of the grass beneath the bush, burning should only be undertaken as part of an overall strategy.

## Mechanical control (grubbing) is useful for large infestations

Mechanical clearing is a useful method of controlling large infestations of gorse. Bulldozers with rippers, or medium to heavy tractors with rippers and dozer blades, can be used. Cutting off established bushes near the soil surface with dozer blades is another option. This method reduces soil disturbance so stimulates fewer seeds into germination. With either method, follow-up management is essential for lasting control, including establishing a vigorous pasture to provide competition, grazing of gorse seedlings and using herbicide on plants that survive grazing.

## Slashing

Regular slashing or mowing is not effective in eradicating gorse. It will eliminate most seed production and keep plants at a low height but they will grow back vigorously once slashing stops.

## Hygiene

Seed is usually carried into new areas in soil and mud attached to machinery or boots. All machinery, tools and footwear should be thoroughly cleaned after use in any gorse-infested area, especially in bushland and forests.

Gorse is increasingly becoming a threat as an environmental weed in many national parks and other bushland areas: Mount Lofty Ranges, SA.
Photo: John Virtue

## 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.au | 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<br>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 gorse 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.

Removing gorse bushes growing on the edges of watercourses is important in preventing spread of seed downstream.

## There are several effective biological control agents

The lack of natural enemies attacking gorse in Australia is one of the reasons why it has become a serious weed. Biological control attempts to restore the balance between gorse and its natural enemies by introducing some of these enemies from Europe into Australia. Research is conducted to ensure that the natural enemies (biological control agents) are safe and will not attack native species or other valuable plants. Biological control is a slow process and will not eradicate gorse. For this reason it should be considered for use only in areas where the application of conventional control methods is inappropriate due to economic, practical or environmental constraints.

The gorse seed weevil *Exapion ulicis* was introduced into Australia in 1939 after being released in New Zealand. The grub stage of the weevil attacks gorse seeds. It is now widespread in Victoria and Tasmania but its impact has been limited because larvae feed only on seeds during spring and early summer and are not present during the second period of seed production during autumn and winter.


The gorse seed weevil (*Exapion ulicis*) was introduced into Australia in 1939 but its impact has been limited.
Photo: George Markin, USDA Forest Service

In 1998 the gorse spider mite *Tetranychus lintearius* was released in Tasmania and Victoria. It forms colonies on the plant which spin a tent-like white web and move around the host plant as a group, feeding and web spinning as they go. These colonies feed on the leaves of mature gorse plants. By spring 2001 the spider mite had become widely established throughout most of the major gorse infestations in Tasmania and over large areas in Victoria. Although the mite is having an impact, it is being reduced by other mites and insects which feed on it and can destroy entire colonies.


The gorse spider mite *Tetranychus lintearius* can appear as a reddish covering on a gorse bush.
Photo: Eric Coombs, Oregon (USA) Dept of Agriculture

The gorse thrips *Sericothrips staphylinus* was first released in Tasmania and Victoria in 2001. Post-release surveys in Tasmania show that it has successfully established but its spread is slow. Increasing its spread will depend on planned redistribution programs. Another thrips (same genus) of Portuguese origin is being reared for field release and it is hoped that it will spread faster.

A further two agents, a pod moth and soft shoot moth, are also under investigation for potential release into Australia.



## Integrated management

In agricultural situations herbicide application, burning, cultivation, pasture establishment and grazing can be combined successfully. Research is being conducted to determine the best methods of integrating biological control with these traditional control methods. Initially, biological control is best targeted for use in large, dense infestations that are unlikely to be controlled using other methods for at least five years.


The small dark green leaves are stiff and covered with a waxy coat which helps reduce water loss, enabling gorse to flourish in areas with low rainfall. Photo: John Virtue, DWLBC

In bushland, mechanical control (eg chainsaw, brush cutter), herbicide application (cut-stump treatment) and revegetation can be combined to control gorse with minimal damage to surrounding vegetation. Several native bird species use gorse for foraging and nesting, so it is a good idea to check plants for bird nests. Seek advice on supplying suitable substitute habitat before clearing a complete patch.

In wasteland areas such as gullies and rocky banks where pasture establishment is not possible, spraying or cut-stump treatment are the most economical and effective control methods if accessibility is not a problem. In the longer term biological control may be useful in restricting gorse in inaccessible areas where herbicide treatment is not possible.

## Legislation

Gorse is a declared weed in Western Australia, New South Wales, South Australia, Victoria, Tasmania and the Australian Capital Territory. Landowners in these states and territories are required to control it. Check with your local council or state/territory government agency about the latest requirements for gorse control.

## Acknowledgments

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Maps: Australian Weeds Committee.

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## Integrated management of gorse in the Tasmanian Midlands

The Southern Midlands Council Landcare Office has been working on gorse control along roadsides since 1994. Initially it focused on small areas and has gradually been able to move on to larger infestations. Once gorse along roadsides was being controlled, the council moved 'over the fence' to work with landholders on a weed management strategy. The council covers 50% of the cost of controlling gorse on private properties and along roadside boundaries, and of treating it in remnant vegetation. As a result, quite a few areas of remnant vegetation have been saved. Local riverbanks and a railway line have also been included in this project, which has been funded by the Commonwealth Government's Natural Heritage Trust.

The council has encouraged biological control of gorse, becoming involved with distribution and release of the gorse spider mite. According to Helen Geard, spokesperson for the council's landcare office, the mite has had an impact. It has slowed down the spread of gorse and suppressed it until landholders can implement other controls. She emphasises the importance of follow-up work and being prepared to revisit treated areas year after year.

Some landholders in the district have successfully used helicopters to spray large expanses of gorse. This is cost-effective over larger areas although follow-up is still important. The action of the helicopter blades allows the spray to get right inside the gorse bush, resulting in excellent coverage. After the helicopter spraying, the area is fenced off for three years to reduce germination. The dying gorse 'mulch' provides extensive shade cover and there is no trigger for seeds to germinate. In a few years time, revegetation with native species will be tried, being aware that gorse has changed the soil profile. Species such as acacias that tolerate high nitrogen levels will be suitable.

Landholders in the area have mixed feelings about burning. Fine wool producers will not burn because they do not want their sheep near burnt gorse bushes due to the risk of contaminating the wool.

Dealing with gorse in and around riverbank areas is particularly tricky, says Ms Geard. In some places they may decide it is better to leave the gorse rather than remove it and leave a bare area prone to erosion, as it provides shade, some habitat and stability.

case study

# How to control gorse

**Quick reference guide**




The spider mite forms colonies connected by a highly visible tent of silk webbing. It is well established in Tas and parts of Vic.
Photo: Peter Martin

A gorse infestation in Zeehan, Tas, being mechanically cleared and mulched.
Photo: Greening Australia, Tas

Good gorse control is difficult, with each situation needing to be assessed individually to determine the appropriate strategy.

## Integrated control

A combination of methods, eg herbicide, mechanical, burning and biological control, is needed for maximum chances of long-term success.

## Herbicides

Apply herbicide when plants are actively growing (during spring to early summer and after autumn rain). Check for regrowth in 12 months. Do not spray when plants are in full flower or when bees are active.

## Grazing

Goats are very good for controlling gorse, but it will grow back if the goats are removed.

## Burning

Burning is a useful tool before grazing or, in dense thickets, before spraying. It stimulates seed germination so needs to be used as part of an overall control program.

## Mechanical control

Mechanical control, using bulldozers or tractors with rippers, is useful for controlling large infestations. Follow-up management is essential for lasting control.

## Hygiene

Thoroughly clean all machinery, tools and footwear after use in any gorse-infested area, especially in bushland and forests.

## Biological control

Biological control agents are being released that will hopefully reduce the vigour of gorse, making plants easier to control in the long term in combination with other methods.

## Follow-up

Killing existing plants is only the start of a long-term control program. The large quantities of seed in the soil will quickly germinate and re-establish new infestations if follow-up work is not repeatedly carried out.


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