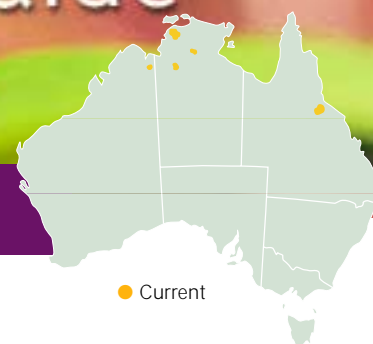


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Weed Management Guide

Barleria or porcupine flower
Barleria prionitis



Barleria or porcupine flower (*Barleria prionitis*)

The problem

Barleria, or porcupine flower, is on the *Alert List for Environmental Weeds*, a list of 28 non-native plants that threaten biodiversity and cause other environmental damage. Although only in the early stages of establishment, these weeds have the potential to seriously degrade Australia's ecosystems.

Barleria has spread into natural ecosystems from gardens and the improper disposal of garden waste. It has the potential to cause economic and environmental damage by forming dense thickets that displace native vegetation and prevent revegetation by native plants. Thickets can impede the movement of stock, restrict access to waterways and reduce the aesthetic values of natural bushland.

Barleria has been found around townships in the Northern Territory (Darwin, Berry Springs, Katherine, Mataranka and the Victoria River district) and Queensland (Townsville) and on Boigu Island in the Torres Strait. In 2002 it was discovered in the Kimberley Region of Western Australia.

The weed

Barleria is an erect, prickly shrub, usually single-stemmed, growing to about 1.5 m tall. The stems and branches are stiff and smooth and light brown to light grey in colour. The leaves are up to 100 mm long and 40 mm wide, and oval-shaped



Barleria's yellow flowers mainly occur in bunches on the tips of the stems, although single flowers also occur near the leaf base.
Photo: Colin G. Wilson

though narrow at both ends (ellipsoid). The base of the leaves is protected by three to five sharp, pale coloured spines, 10–20 mm long.

The yellow–orange tubular flowers are found bunched tightly together at the top of the plant, but they also occur singly at the base of leaves. The flowers are 40 mm long and tubular, with several long protruding stalks (stamens).

The seed capsule is oval-shaped and 13–20 mm long, with a sharp pointed beak. It contains two fairly large, flat seeds, typically 8 mm long by 5 mm wide, covered with matted hairs. Barleria has a central tap root, with lateral roots branching off in all directions.

Key points

- Barleria is a hardy, prickly shrub which is well adapted to the wet–dry tropics of northern Australia.
- Preventing its spread will protect savannas and riverine habitat of northern Australia.
- Because it escapes from gardens, other species should be planted instead.
- Control can be achieved via physical and chemical means and is most effective in the wet season.
- If you see a plant that may be barleria, contact your local council or state or territory weed management agency (see weed control contacts table on p.4).



Barleria or porcupine flower – Barleria prionitis



Growth calendar

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Flowering		■	■	■	■	■	■	■				
Seed formation					■	■	■	■	■	■		
Seed drop							■	■	■	■	■	■
Dieback					■	■	■	■	■	■	■	
Regrowth											■	■
Germination											■	■

■ General pattern of growth ■ Growth pattern in suitable conditions

Barleria is considered to be a perennial species because it lives for more than one year. It is well adapted to the climate of northern Australia, which has distinct wet and dry seasons. During the dry season when virtually no rain falls (generally May–September), its stems, leaves and flowers die off although the roots remain alive. The vegetation then regrows after the first rains of the wet season, and it flourishes during the remainder of the wet season. Dieback of above-ground vegetation on Boigu Island in the Torres Strait generally occurs between September and November, a little later than on the mainland.

Seeds germinate early in the wet season, following the first significant storms, and grow steadily during the remainder of the wet season. It is not definitively known how old seedlings are before they first flower. In Katherine plants do not flower until they are at least half a metre tall and their estimated age is one year. In northern Australia flowering occurs at the end of the wet and start of the dry season (typically April–May). Fruiting occurs several months after flowering, at the end of the dry season. Seeds germinate fairly soon after they are dropped, soil moisture permitting.

On Boigu Island barleria is thought to flower and fruit over a more extended period. This is probably related to the climate, which has more regular rainfall and shorter dry seasons than on mainland northern Australia.

Barleria plants can probably live for about ten years in good conditions.



Flowering mainly occurs at the end of the wet season between April and May.
Photo: Colin G. Wilson

How it spreads

Barleria reproduces by seed, one plant producing up to hundreds of seeds in a season. It is not known how long the seeds remain viable in the soil after being dropped but it is likely to be at least several years. Seeds require moist conditions to germinate. Although most seeds germinate within a few metres of the parent plant, infestations can move relatively quickly downhill, where seed transport may be aided by water. Also, as seen in the Torres Strait infestation, seed spread may be quicker along paths or roads.

Many plants that are closely related to barleria are capable of vegetative reproduction when cuttings or stem fragments encounter a suitably moist environment that allows them to start growing roots. Barleria can probably also reproduce vegetatively.

Regardless of whether it has reproduced by seed or cutting, most recorded infestations in Australia have been traced back to escapees from gardens. It is thought that the Katherine infestations developed from garden waste that was dumped in bushland or transported on heavy machinery.



The presence of sharp spines guarding the leaf base reduces access and prevents stock movement in dense infestations of barleria.
Photo: Colin G. Wilson





Barleria is an erect prickly shrub growing to 1.5 m that is well suited to the wet-dry tropics of northern Australia.
Photo: Colin G. Wilson

The infestations at Victoria River Downs and in the Kimberley Region were initially parts of gardens. The Torres Strait outbreak was first noticed where the trimmings from a garden specimen were placed two years previously.

Where it grows

Barleria grows on a wide variety of soil types and seems to prefer well-drained soils. On the Australian mainland it grows well in tropical savanna country and along riverbanks. It is particularly hardy, and in the Katherine region flourishes on rugged limestone outcrops with little soil cover by clinging to the rocks and crevices with a network of roots. The small infestation on Boigu Island is growing on sandy soil. Barleria also grows well in disturbed areas such as roadsides or overgrazed pastures.

Barleria is well adapted to the wet-dry tropics and flourishes in savanna and on riverbanks

Barleria is native to tropical East Africa and Asia, including India, Indonesia, Malaysia and the Philippines. It has been cultivated throughout the world as an ornamental plant, and has escaped from gardens in many regions including Mauritius, Hawaii, Puerto Rico and Papua New Guinea. Barleria has some beneficial

properties that undoubtedly have helped increase its distribution: it is used as a hedge plant; it has numerous medicinal properties including treating fever, respiratory diseases, toothache, joint pains and a variety of other ailments; and it has several cosmetic uses.

Why we need to be 'alert' to barleria

Barleria is a troublesome weed in many overseas countries. It has the potential to be a very serious weed of tropical savannas, riverbanks and grasslands of northern Australia. Infestations can reduce the movement of stock and access to water. Because barleria is unpalatable to stock, infestations reduce the productivity of pastoral country and can provide refuge for feral animals. Other impacts could include a reduction in the aesthetic beauty and diversity of plants and animals in natural environments, and a reduced capacity for indigenous people to exploit natural resources.

The Alert List for Environmental Weeds

The Federal Government's *Alert List for Environmental Weeds* was declared in 2001. It consists of 28 weed species that currently have limited distributions but potentially could cause significant damage. The following weed species are therefore targeted for eradication:

Scientific name	Common name	Scientific name	Common name
<i>Acacia catechu</i> var. <i>sundra</i>	cutch tree	<i>Koelreuteria elegans</i>	Chinese rain tree
<i>Acacia karroo</i>	Karoo thorn	<i>Lachenalia reflexa</i>	yellow soldier
<i>Asystasia gangetica</i> ssp. <i>micrantha</i>	Chinese violet	<i>Lagarosiphon major</i>	lagarosiphon
<i>Barleria prionitis</i>	barleria	<i>Nassella charruana</i>	lobed needle grass
<i>Bassia scoparia</i>	kochia	<i>Nassella hyalina</i>	cane needle grass
<i>Calluna vulgaris</i>	heather	<i>Pelargonium alchemilloides</i>	garden geranium
<i>Chromolaena odorata</i>	Siam weed	<i>Pereskia aculeata</i>	leaf cactus
<i>Cynoglossum creticum</i>	blue hound's tongue	<i>Piptochaetium montevidense</i>	Uruguayan rice grass
<i>Cyperus teneristolon</i>	cyperus	<i>Praxelis clematidea</i>	praxelis
<i>Cytisus multiflorus</i>	white Spanish broom	<i>Retama raetam</i>	white weeping broom
<i>Dittrichia viscosa</i>	false yellowhead	<i>Senecio glastifolius</i>	holly leaved senecio
<i>Equisetum</i> spp.	horsetail species	<i>Thunbergia laurifolia</i>	laurel clock vine
<i>Gymnocoronis spilanthoides</i>	Senegal tea plant	<i>Tipuana tipu</i>	rosewood
<i>Hieracium aurantiacum</i>	orange hawkweed	<i>Trianoptiles solitaria</i>	subterranean cape sedge

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
NT	Dept of Natural Resources, Environment and the Arts	(08) 8999 4567	weedinfo.nreta@nt.gov.au	www.nt.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 www.dse.vic.gov.au
WA	Dept of Agriculture	(08) 9368 3333	enquiries@agric.wa.gov.au	www.agric.wa.gov.au

The above contacts can offer advice on weed control in your state or territory. If 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.

What to do about it

Prevention is better than the cure

As with all weed management, prevention is better and more cost-effective than control. The annual cost of weeds to agriculture in Australia, in terms of decreased productivity and management costs, is conservatively estimated at \$4 billion. Environmental impacts are also significant and lead to a loss of biodiversity. To limit escalation of these impacts, it is vital to prevent further introduction of new weed species, such as *barleria*, into uninfested natural ecosystems.

In the past various *barleria* species have been offered for sale in nurseries around Australia. Notify the vendor or state or territory weed control contacts if you find *barleria* for sale.

Early detection and eradication are also important to prevent the spread of *barleria*. Small infestations can be easily eradicated if they are detected early but an ongoing commitment is needed to ensure new infestations do not establish.

Quarantine to prevent further introductions

The importation of *barleria* into Australia is not permitted because of the risk of

further spread, and the potential introduction of new genetic diversity that could make future control more difficult.

Do not buy seeds via the internet or from mail order catalogues unless you check with quarantine first and can be sure that they are free of weeds like *barleria*. Call 1800 803 006 or see the Australian Quarantine and Inspection Service (AQIS) import conditions database <www.aqis.gov.au/icon>. Also, take care when travelling overseas that you do not choose souvenirs made from or containing seeds, or bring back seeds attached to hiking or camping equipment. Report any breaches of quarantine you see to AQIS.

Raising community awareness

Some 65% of weeds, including *barleria*, which have recently established in Australia have escaped from plantings in gardens and parks. The detrimental impacts of these weeds far outweigh any potential horticultural benefits. The public should be made more aware of these impacts, and of other issues such as how to identify *barleria* and what to do if they find it.

During the flowering season (April–May), *barleria* has distinctive yellow–orange flowers. However, the vegetation dies

back during the dry season, making identification more difficult. The spines at the leaf base and the shape of the seed capsule will aid in identification.

Also, be aware of another weedy species of *barleria*, *Barleria lupulina* (see Box, p. 5).

New infestations of *barleria*

Because there are relatively few *barleria* infestations, and it can potentially be eradicated before it becomes established, any new outbreaks should be reported immediately to your state weed management agency or local council. Do not try to control *barleria* without their expert assistance. Control effort that is poorly performed or not followed up can actually help spread the weed and worsen the problem.



Barleria infestation after herbicide treatment, Victoria River Downs Station, NT. Photo: Victoria River District Conservation Association



Barleria control in northern Australia

Experience throughout Australia has shown that if the willingness and resources exist, barleria can be relatively easily controlled, especially if it is attacked while infestations are still small.

Physical and chemical control in Katherine, Northern Territory

Physical and chemical control have been successfully used to control barleria. In the Katherine region, where several small infestations were present, herbicides were applied to the areas most infested with barleria by spraying whole plants from a pneumatic 7-litre backpack hand-sprayer. Isolated plants were removed by hand. It is important to wear gloves when pulling up barleria by hand due to the many sharp spines on its branches. It is also important to burn any plant material removed by hand to prevent resprouting from stems or seeds.

Approximately half a hectare of land near Katherine was successfully treated in this way by 13 people in about 3 hours, including the treatment of several other weed species. The treatment was a joint effort between the Katherine District Farmers Association, Greening Australia and the Katherine Landcare Group. Follow-up control continues to be undertaken by the landowner. Small pockets of the infestation that escaped initial treatment, or have germinated since treatment, emphasise the importance of vigilant follow-up work.

Chemical control in the Kimberley Region, Western Australia

Herbicides were used to control a Kimberley infestation, south of Kununurra, which had escaped from a garden bed planted several years earlier. The barleria

had spread down a rocky slope and into a creek, where it was flourishing. When it was identified as a weed in 2001, control work was quickly commenced by the foliar spraying of herbicides over entire plants. All plants that were sprayed in the first application were killed, and follow-up work in 2002 consisted of locating and spraying any plants that were missed in the initial spray. Follow-up work will be ongoing over the next several years to ensure that all mature barleria plants have been eradicated and any new seedlings are treated before they flower and set seed.

Legislation

Landholders in the Northern Territory are required by law to eradicate barleria and it must not be further introduced there. Barleria has not been formerly assessed in Western Australia, although it is considered a prohibited plant because of its status in the Northern Territory. Although present in Queensland, it has not been declared a weed there.

Acknowledgments

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Map: Base data used in the compilation of distribution map provided by Australian herbaria via Australia's Virtual Herbarium.



Hophead, or Philippine violet (*Barleria lupulina*) is another yellow-flowering weedy species of barleria present in Australia and also naturalised as a weed in Hawaii, Florida, Timor, Papua (Irian Jaya) and Christmas Island. Photo: Colin G. Wilson



The leaves of *Barleria lupulina* have a prominent red mid-vein and are longer and narrower than those of *B. prionitis*. Photo: Colin G. Wilson

Another weedy species of barleria – *Barleria lupulina*

Another species of weedy, yellow-flowering barleria is also found in Australia. This is *Barleria lupulina*, commonly known as hophead or Philippine violet. It may be distinguished from *Barleria prionitis* because it has longer, narrower leaves which are darker green with a prominent red mid-vein. It is a weed in Hawaii, Florida, Timor, Papua (Irian Jaya) and Christmas Island, and has been more widely cultivated in northern Queensland (eg Cairns, Cooktown) than *Barleria prionitis*. Although less is known about *Barleria lupulina*, it should also be considered as a serious threat to northern Australia, and should not be regarded as a suitable replacement for *Barleria prionitis*.



If you find a plant that may be barleria

Quick reference guide

Identification

You will first need to confirm its identity. Contact your state or territory weed management agency or local council for help in identifying the plant. You will need to take note of the characteristics of the plant in order to accurately describe it. Some important features of barleria include:

- yellow–orange tubular flowers in tight bunches at the top of the plant, and singly at the leaf base, occurring mainly during April and May

- three to five sharp pale spines at the leaf base
- oval-shaped seed capsules with a sharp beak at the end, which are not dropped until September–October.

Reporting occurrences

Once identified, new occurrences of barleria should be reported to the relevant state or territory weed management agency or local council, who will offer advice and assistance on its control. Because it spreads so easily and poses such a serious threat, its control should

be undertaken with the appropriate expertise and adequate resources.

Follow-up work will be required

Once the initial infestation is controlled, follow-up monitoring and control will be required to ensure that reinfestation does not occur.

Collecting specimens

State or territory herbaria can also identify plants from good specimens. These organisations can provide advice on how to collect and preserve specimens.

State/Territory	Postal Address	Phone	Web
Australian National Herbarium	GPO Box 1600 Canberra, ACT, 2601	(02) 6246 5108	www.anbg.gov.au/cpbr/herbarium/index.html
National Herbarium of New South Wales	Mrs Macquaries Rd Sydney, NSW, 2000	(02) 9231 8111	www.rbgsyd.nsw.gov.au
National Herbarium of Victoria	Private Bag 2000 Birdwood Avenue South Yarra, Vic, 3141	(03) 9252 2300	www.rbg.vic.gov.au/biodiversity/herbarium.html
Northern Territory Herbarium	PO Box 496 Palmerston, NT, 0831	(08) 8999 4516	http://www.nt.gov.au/ipe/pwcnt/
Queensland Herbarium	c/- Brisbane Botanic Gardens Mt Coot-tha Rd Toowong, Qld, 4066	(07) 3896 9326	www.env.qld.gov.au/environment/science/herbarium
South Australian Plant Biodiversity Centre	PO Box 2732 Kent Town, SA, 5071	(08) 8222 9311	www.flora.sa.gov.au/index.html
Tasmanian Herbarium	Private Bag 4 Hobart, Tas, 7000	(03) 6226 2635	www.tmag.tas.gov.au/Herbarium/Herbarium2.htm
Western Australian Herbarium	Locked Bag 104 Bentley DC, WA, 6983	(08) 9334 0500	http://science.calm.wa.gov.au/herbarium/

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