

# WEEDS

## of the Riverina



a guide to identification  
and control

a guide to identification and control

This booklet provides an introduction to some of the noxious and environmental weeds of the Riverina. It covers both weeds of agriculture and bushland and other areas of natural vegetation such as native grasslands.

It is our hope that by becoming familiar with local weeds you will be encouraged to remove weeds from your own property and to join with others in cleaning up public land. Further information is available from the books and websites listed at the back. Encourage your local library to obtain these books to make the information in them more widely available.

## Acknowledgements

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New booklet compilation and additional weeds text added by Adam Craig and Jeremy Crocker, including Bridal Creeper, Cane Needle Grass, Coolatai Grass, Alligator Weed, Salvinia, Water Hyacinth, Sagittaria, Mesquite, Mimosa, Johnson's Grass, Onion Weed, Hardhead Thistle, St. Barnaby's Thistle, Wild Radish, Noogoora Burr, Gorse and Blue Heliotrope. Additional photos supplied by Neil Hibberson and Paula Ash.

**Murrumbidgee Catchment  
Management Authority**  
Phone: 02 69 32 3232



**Lower Murray Darling Catchment  
Management Authority**  
Phone: 03 5021 9460



**Murray Catchment  
Management Authority**  
Phone: 03 5880 1400



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## Contacts for the Eastern and Western Noxious Weeds Advisory Groups

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### Rural Lands Protection Boards:

Balranald Rural Lands Protection Board	03 5020 1691
Hay Rural Lands Protection Board	02 6993 1403
Gundagai Rural Lands Protection Board	02 6944 1588
Hume Rural Lands Protection Board	02 6040 4210
Murray Rural Lands Protection Board	03 5886 1203
Narrandera Rural Lands Protection Board	02 6959 2322
Riverina Rural Lands Protection Board	03 5881 1055
Wagga Rural Lands Protection Board	02 6921 3034
Wentworth Rural Lands Protection Board	03 5027 3064

### Councils:

Albury City	02 6023 8111	Narrandera	02 6959 5560
Corowa	02 6033 8960	Tumbarumba	02 6948 2022
Cootamundra	02 6940 2100	Tumut	02 6941 2557
Gundagai	02 6944 0200	Urana	02 6930 9100
Greater Hume	02 6029 8588	Wagga Wagga City	02 6926 9202
Lockhart	02 6920 5305		

### Riverina Eastern Noxious Weeds Authority:

Comprising of Coolamon, Junee and Temora Councils  
Contact 02 6978 0733 or 0427 487 139

### Western Riverina Councils:

Balranald	02 5020 1300	Jerilderie	03 5886 0025
Bland	02 6972 2266	Leeton	02 6953 2611
Carrathool	02 6965 1306	Murrumbidgee	03 6968 4166
Griffith City	0418 471 700	Wakool	02 5887 5201
Hay	02 6993 1003	Wentworth	03 5027 3203

### Riverina Noxious Weeds Project Officer:

ERNWAG and WRNWAG – Phone: 02 6026 3800

## Weeds don't recognise borders!

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The Local Government Councils and Rural Lands Protection Boards in partnership with the Lower Murray Darling, Murray and Murrumbidgee Catchment Management Authorities (CMA) have developed three Regional Weed Strategies across the Riverina. These Strategies provide comprehensive direction for weed management in the catchments, giving clear directions for community and government (State and Local) investment in weed management. Priority weed listings for each catchment can be found within the strategies. Strategies are available from your local council or CMA office.

*Weeds stated noxious in this brochure were declared at the time of printing and are subject to change. Consult your local Council for declaration updates.*

## What is a Weed?

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To a gardener, a farmer or a botanist a weed may mean different things, but broadly it is a plant growing outside its natural environment and having some sort of adverse impact. The majority of weeds are from overseas but some native Australian plants grown outside their natural range can also become weeds within Australia. Whatever their origin they spread “like weeds” when they arrive in a favourable environment, often because they have left their natural pests and diseases behind.

## Types of Weeds

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**DECLARED NOXIOUS WEEDS** have been proclaimed under the Noxious Weeds Act 1993, generally because they are serious economic pests, toxic to stock or a danger to human health. They are usually weeds of agriculture, but most are also significant environmental weeds. Landowners and managers are legally required to control these weeds. The species listed as noxious vary between different parts of NSW. A list of the species declared as noxious in your area can be obtained from the website [www.agric.nsw.gov.au/noxweed/](http://www.agric.nsw.gov.au/noxweed/)

Weeds listed as noxious in any of the Riverina shires at the time of printing are marked as **NOXIOUS** in this booklet.

**ENVIRONMENTAL WEEDS** are plants that invade native vegetation and may replace native plants and cause loss of habitat for native animals. Some environmental weeds have been declared noxious but many have not and there is no legal requirement to control them.

A plant may be both an agricultural and an environmental weed, depending on where it is growing.

## Why do Weeds matter?

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The huge financial cost to agriculture of weeds and weed control is well known but the impact of weeds on natural vegetation has only recently been widely recognised. Weed invasion is one of the greatest threats to some types of native vegetation, particularly when that vegetation is close to towns and farming land.

Weeds can come to dominate the vegetation in these areas, preventing regeneration of native plants or even killing them in some cases. They may reduce the habitat available for native animals and alter the visual character of the landscape. They can increase the fuel load making areas more fire-prone.

## Why do Weeds invade?

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Two things are needed for weeds to invade vegetation: a source of propagules (seed, bulbs, pieces of stem or root) and suitable growing conditions. Disturbance is not essential but it increases the likelihood of weeds becoming established by reducing competition for resources by more desirable plants, creating bare ground, changing soil conditions and stimulating seed germination.

Possible sources of disturbance are

- earth-moving or cultivation
- removal of the existing vegetation cover by herbicides or fire
- grazing and trampling by livestock
- nutrient enrichment with fertilisers or manure
- enhanced soil moisture due to runoff from paved surfaces or compacted soil
- flooding, which can remove vegetation and deposit sediment.

Seed and other propagules can be moved around in a number of ways

- dumped in garden refuse
- blown on the wind
- carried in water
- spread by cars, mowers, agricultural or earth-moving machinery
- imported in soil, gravel, mulching materials, potted plants, hay and other stock feeds
- excreted by birds or other animals if packaged in edible fruits
- carried on animals and birds attached to fur, feathers or in mud on their feet
- in the gut of livestock which have fed on weedy pasture, grain or hay
- carried on clothing or in mud on boots.

## What can I do?

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In general

- Learn to recognise weeds and take early action to remove them from your property. Monitor areas where you have imported materials or created disturbance, and be ready to control weeds as soon as they appear.
- Have unfamiliar plants identified if you think they may be weeds. Council weeds/vegetation officers and NSW DPI can assist with identification and control advice.
- Join or form a Bushcare or Landcare Group and become active in rehabilitating weedy areas.

### On the farm or rural block

- Avoid unnecessary soil disturbance.
- Avoid overgrazing as this creates ideal conditions for weed invasion.
- Insist that contractors' machinery is cleaned before being used on your property and monitor areas where such machinery has worked for new weed arrivals.
- Clean your own equipment before moving between areas.
- Minimise driving over the property which compacts the soil and spreads weed seed.
- When feeding stock on imported hay or grain do it in a restricted area and monitor afterwards for weeds.
- Quarantine new livestock for up to two weeks so weed seeds can pass through them in a confined area which can be treated later.
- Seek information on the weeds present on properties from which feed or stock are bought and avoid properties with significant weed problems.
- Don't shift stock straight from weedy areas into clean paddocks or areas of remnant native vegetation, especially when weeds are seeding.
- Get to know when weeds on your place flower and time your control efforts to prevent seed set.
- Be vigilant, and act early. Don't wait until a few plants turn into a major infestation.

### In the garden

- Don't dump garden waste. Compost it or take it to the tip.
- Don't dump water plants into water bodies or into the drains.
- Don't buy seed from overseas as it may be contaminated with weed seed, or be a weed species itself. Many overseas plants are prohibited imports.
- Don't extend your garden into adjacent vacant land.
- Eliminate nutrient-rich runoff from your garden. Don't use fertilisers unnecessarily. Collect animal faeces and compost them.
- Remove any plants listed in this guide from your garden and replace them with plants which will not spread.
- Avoid planting any plants with berries which are not native to the area regardless of where you live, since birds can spread them over long distances. If you live close to native vegetation also avoid anything with fine wind-blown seed and bulbs with a tendency to self-seed. Talk to your nursery salesperson about the weed potential of plants before you buy them.

## Controlling Weeds

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Weeds thrive on disturbance. As well as taking action to remove weeds you need to look at what has contributed to the infestation and treat the causes as well as the symptom (the weeds). If reliance is placed on simply spraying weeds whenever they appear you may be embarking on an expensive spiral of increasing disturbance and increasing infestation. Healthy, vigorous native vegetation or pasture (native or exotic) can be quite weed-resistant.

Timing is crucial in weed control. Remove weeds before they produce seed. If you are too late, collect the seed and burn it, bury it deeply, or place it in plastic bags in the sun to rot. However the rotting process requires moisture so make sure you include some moist, green material. Plastic bags are easily broken, so don't take weeds carrying light wind blown seed to the tip, whether in bags or not.

Removing a weed may simply result in its replacement by another rapidly growing coloniser of empty space, often another weed. Look at the whole picture and decide what you want to achieve before starting a weed control program. An integrated control program is preferable to reliance on a single method. Seek advice from Council or NSW DPI when developing a long term weed control program.

## Methods

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**Hand pulling, chipping or digging** is the cheapest method of weed control for small infestations but it is time consuming. Young plants are often easy to pull out if soil is moist. If soil is dry or plants are big you are likely to leave enough material still in the ground for the plant to grow again. Some plants will recover unless every bit of the root system is removed and these are better sprayed. Digging is better avoided if it will cause a lot of disturbance in otherwise relatively undisturbed soil as this will only encourage the germination of more weed seed.

**Cultivation** can be used to kill weeds where the land is arable. To be successful as a weed control method it must be followed by the planting of a suitable competitive species which is properly managed. Seek advice on appropriate techniques and machinery for the soil type.

**Slashing or mowing** can be used to delay production of seed until more permanent control can be undertaken. However, it is not a permanent method of control itself and if plants have already seeded it can result in spreading that seed even further. It is most useful for preventing seeding in short-lived annual or biennial weeds.

**Solarisation** involves heating weeds to lethal temperatures under clear (or coloured) plastic. It can be useful for low-growing and semi-aquatic weeds but will work best when they are growing in full sun. It may or may not kill any seed stored in the soil. It is best used for small, dense infestations as it is not selective. Plastic may need to be left in place for months and should be weighted down.

**Grazing** by goats and other livestock can be used to prevent seeding and remove weeds. Any stock applied at the right time and in adequate numbers can reduce seeding of annual grasses. Goats are useful on many weeds, notably thistles, blackberry and briar rose, but large numbers will be needed on big infestations. They need good fencing and can be hard on any bush in the paddock.

**Fire** can play a part in controlling weeds, although it can also pave the way for weed infestation by creating bare ground. Timing is important. Burning in autumn may encourage weeds by leaving the ground bare through winter, when many local weeds are growing. Burning in spring is less likely to leave bare ground for a long period. Burning of some native grasses which are not being grazed has been shown to be necessary for their health. Without some form of defoliation (burning, slashing or grazing) grasses such as kangaroo grass can lose vigour and the pasture becomes more susceptible to weed invasion. Lack of burning in the bush around towns can allow exotic plants which would not survive fire such as apple and hawthorn to become dominant. Fire can also be used to stimulate mass germination of hard-seeded species such as broom, which can then be sprayed.

**Herbicides** are very useful in the battle against weeds but need to be used carefully. Spot spraying individual plants is preferable to broad scale spraying, where practical. It is also preferable to use the appropriate selective herbicide to minimise damage to non-target plants. The use of non-selective herbicides (which kill every plant they contact) creates bare ground, which only encourages further weed invasion. Use an application method other than spraying if possible (see next page) to avoid off-target damage. Do not rely on herbicide use alone as weeds are likely to re-establish on the bare ground it creates. A vigorous cover of desirable plants is the best safeguard against further weed invasion.

Remember some herbicides are poisons so take precautions to avoid getting them on your skin or breathing the vapour. Wear overalls, rubber gloves and a face mask if recommended on the label. Always read the instructions on the label before use. To avoid spray drift do not spray in windy conditions. There are restrictions on using herbicides near waterways.

Herbicides are meant to be used only on the plants for which their use is registered. Check the label. For many non-agricultural weeds not listed on product labels there may be an off-label permit which covers them. If in doubt contact NSW DPI, the National Registration Authority, Council weeds officers or the product manufacturers. Note that under the Pesticides Act 1999 it is an offence to use a herbicide in a manner that could cause injury to a person, damage to another's property or harm to a non-target plant. Farmers and other commercial users must keep records of herbicide use.



## When to use herbicides

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- If it is the most efficient method available and only after you have read the label.
- Apply herbicide when the plant is actively growing.
- Do not use herbicide when the plants are drought stressed, in extremely hot or cold conditions or when plants are diseased.
- Don't spray when it is windy or if rain is likely.
- For many plants the best time to treat is between flowering and fruit set.
- Spray deciduous plants in late spring through to early autumn when in full leaf. If leaf colour has begun to turn it is too late.

## Methods of Application

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**Spraying** should not be done in windy conditions. If plants are tall it may be easier and safer to slash them first and spray when there is vigorous regrowth. Ensure old grass tussocks have some new growth in them to absorb the chemical. If not they may need to be slashed or grazed first to promote fresh growth. Avoid spraying non-target plants and to minimise damage to other plants use a selective herbicide if possible. Mix it to the right concentration for the target species (check the label) and spray to thoroughly wet foliage, but no more. If the plant you are treating has waxy leaves you may need to add a wetting agent to improve absorption of the herbicide. Adding dye makes it much easier to see where you have sprayed.

**Weed wipers** can be used to apply herbicides to foliage in a more targeted manner. There is a range of possibilities from wiping herbicide onto individual plants with a sponge in a gloved hand (useful for bulb foliage), to hand-held wick wipers, to larger wipers towed behind a tractor or quad bike. This method can be useful for removing taller weeds without affecting the shorter growth beneath them. Generally, wiping with two passes at 90° to each other is needed to ensure sufficient coverage. Check whether the chemical you plan to use is registered for this method of application.

**Stem injection** is used on woody weeds when you want them to die in place rather than cutting them down. There are purpose-built stem injection devices but the job can also be done with a hammer and chisel or a cordless drill. You need to make an angled cut or hole down into the sapwood just below the bark and apply herbicide into the cut immediately. Don't drill or cut too deeply or you will get into the heartwood, which does not take up the herbicide.

**Cut and paint** is suitable for woody weeds. The plant is cut off close to ground level with a horizontal cut, and herbicide (usually glyphosate) applied immediately to the cut surface (check the label for dilution rates). If you are too slow air is sucked into the sap vessels preventing entry of the herbicide. In some plants such as willows it may be necessary to apply herbicide to both the stump and the cut end of the rest of the tree. This ensures that the top part of the plant dies rather than taking root again if it is left lying on moist soil. For a larger stump only the outer edge just inside the bark (the sapwood) needs to be treated. Wear rubber gloves and avoid moving around carrying an open container of herbicide. This method and the one below are best done as a two person job.

**Scrape and paint** is used for large vines and scrambling plants with a woody stem. Scrape 20 to 100cm of the stem with a knife to expose the sapwood just below the bark. Apply herbicide immediately to the scraped section. Don't scrape right around the stem, do only a third of the diameter. Stems over 1cm in diameter can be scraped on two sides. If killing vines leave them to die in place. Pulling them down can damage the plants they are growing over.

**Basal bark treatment** can be used on young woody weeds and root suckers. Diluted herbicide (check label for rates) is painted or sprayed onto the bark at the base, from ground level to 30cm high.

Refer to the NSW DPI booklets, *Noxious and Environmental Weed Control Handbook* and *Weed Control in Lucerne and Pasture*, and the *NSW DPI Agfact Series* for specific weed by weed information.



Gardens, public and private, are a major source of environmental weeds. This old municipal planting includes privet, broom and cotoneaster. These are all highly invasive plants.

Avoid planting 'garden thugs'. There are many equally attractive non-invasive plants.

**African Boxthorn** (*Lycium ferocissimum*)**NOXIOUS****Description**

A large intricately branched shrub, with long sharp spines. Leaves are small, bright green, smooth and slightly fleshy. Small white flowers with purple markings. Fruits are rather tomato-like, but only 1cm diameter.

A weed of open pasture in farming areas, boxthorn usually grows under trees and fences.

**Dispersal**

Birds and foxes.

**Look-alikes**

Three native spiny shrubs may be confused with boxthorn. Tree violet or gruggly bush (*Hymenanthera dentata*) has sparse toothed leaves and the flowers are tiny yellow bells which hang along the underside of the branches, followed by purple-black or white berries. It is usually less than 1m high and often grows among rocks. Its spines are alternate.

Anchor plant (*Discaria pubescens*) grows 0.3-1.5m high and has paired spines about 5cm long and no leaves, except in spring, when it also produces clusters of white flowers at the base of the spines.

Blackthorn (*Bursaria spinosa*) has small white flowers in large clusters at the end of the branches in summer followed by brown papery seed capsules.

**Control**

Hand-pull seedlings. Cut and paint, basal bark or spray. Seedlings are likely after removal of adult plants, and suckers may arise from the roots and will need follow-up work. Sprayed plants may leaf up again several times before finally dying.

## WOODY WEEDS

**Blackberry** (*Rubus fruticosus aggregate*)

**NOXIOUS**

**Briar Rose or Sweet Briar** (*Rosa rubiginosa*)

**NOXIOUS**



### Description

Deciduous thorny shrubs. Blackberry forms spreading clumps to 3m high. Briar rose is more erect in habit. Blackberry flowers are white, smaller (2-3cm across) than those of briar rose but similar in form. The fruits are large, succulent and black. Briar rose produces smooth orange-red "rosehips".

Blackberry does best in cool moist sites such as gullies. Briar rose grows in pasture, native grassland and bush.

### Dispersal

Birds, foxes. Blackberry also roots at the branch tips where these touch the ground. Root suckers.

### Look-alikes

There are several varieties of blackberry, all similar in appearance and all weeds. The native small-leaved bramble (*Rubus parvifolius*) is a small trailing plant with pink flowers and small red fruits which grows in woodland and forest and among rocks in native grassland.

### Control

Spray with a woody weed specific herbicide. Goats provide very good control of both. Slashing can keep blackberry from forming tall clumps but never gets rid of the plant. Plants can be dug out, but will re-sprout if any roots are left behind. An introduced fungus, blackberry rust, was released in the 1980s. It can become common in wet summers, and reduces the vigour of plants.

## Box elder (*Acer negundo*)



### Description

Deciduous tree to 20m high with smooth, grey bark, corky on the trunk of older trees. Young branches are olive green with a white waxy bloom. Compound leaves are in opposite pairs with 3-7 (rarely 9) toothed leaflets. Flowers tiny, appearing before or with leaves in spring. Seeds paired and winged in large hanging clusters. Variegated leaved cultivars are often sold but these may revert to green.

Invades river banks and woodland, preferring damp sites, but it can tolerate dry soils.

### Dispersal

Seed spread by wind and water.

### Look-alikes

Another exotic, Sycamore Maple (*Acer pseudoplatanus*) has scaly bark and a simple leaf with five pointed lobes. The seeds are similar, often reddish. This tree also produces huge seed crops and is weedy in cool, moist climates.

### Control

Hand pull or dig out seedlings. Cut and paint or stem inject mature plants or spray smaller plants.

### **Bridal Creeper** (*Asparagus asparagoides*)

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#### **Description**

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An erect, climbing woody perennial herb to 3 metres reproducing by tubers and seed. Stems are slender, twining and changing direction at each node. Leaves are glossy green, sharply pointed and broadly ovate 1-5mm in length. Flowers are greenish white in colour, 8-9mm in diameter.

Fruit is in the form of a red sticky globose berry, 6-10 mm in diameter. Seeds are black shiny 3-4mm in size. The roots consist of a short thick rhizome giving rise to tuberous roots.

#### **Dispersal**

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Spread is thought to be mostly by birds eating the sticky fruit which pass viable seed through excrement and can be spread over vast distances from the parent plant. Mud adhering to animals, clothing and machinery is also thought to spread the seeds of Bridal Creeper. Disturbance and movement of the root tubers can also assist in its spread.

#### **Look-alikes**

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The wiry native vine, Wombat Berry (*Eustrephus latifolius*) is similar in appearance, but the leaves are longer and narrower and lack the glossy appearance of Bridal Creeper.

#### **Control**

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Single plants can be carefully dug up; ensuring all of the underground biomass of tubers is removed. Herbicide can be effective in larger infestations to assist in control; however care should be taken to avoid/minimise off target damage to crops and bushland.

Several Biological control agents in the form of host specific insects and rusts have been released with varied rates of success.

**Cotoneaster** (*Cotoneaster* spp.)

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**Hawthorn** (*Crataegus monogyna*)

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**Pyracantha or Firethorn** (*Pyracantha angustifolia*)

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**Privet** (*Ligustrum* spp.)

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## Description

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**Cotoneaster:** Several species of evergreen or semi-deciduous shrubs 2-4m high, sometimes semi-prostrate (*C. horizontalis*). Leaves oval, with a dull green upper surface and usually a white underside. Clusters of small white or pink flowers are followed by small red or orange-red fruits.

**Hawthorn:** Deciduous spiny large shrub or small tree to 10m. Bark smooth and grey. Leaves 3 to 7 lobed. Large white or pinkish flowers in clusters. Fruits are red, fleshy, about 1cm diameter.

**Pyracantha:** Similar to cotoneaster, but spiny, with narrow-oval, sometimes toothed, leaves. White flowers and orange berries.

**European Privet:** Evergreen or deciduous shrub to 5m (usually 1m) with rounded leaves, terminal sprays of small white flowers and shiny black berries.

All originally garden plants which are now widespread weeds in pasture, native grassland and bush.

These plants may be seen as providing valuable food for birds. However, they often encourage the build up of exotic species such as blackbirds or of opportunist native birds like pied currawongs which prey on the nestlings of more desirable bird species.

## Dispersal

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Birds and foxes. Seeds in dumped garden waste.

## Look-alikes

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Feral fruit trees, cherry plum (*Prunus cerasifera*) and apple (*Malus X domestica*) have similar flowers to hawthorn, but simple leaves with serrated edges.

## Control

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Cut and paint, stem inject or spray. Seedlings and smaller plants can be hand-pulled or dug. Root suckers are likely to arise after treating the parent plant, and these will need follow-up cutting and painting or spraying.



**WOODY WEEDS**



*(above)* Two species of Cotoneaster growing together.  
Note different leaf and fruit size and colour.



**HAWTHORN**



**PYRACANTHA**



**PRIVET**



**Mesquite** (*Prosopis* spp.)

**NOXIOUS**

**Mimosa** (*Mimosa pigra*)



MESQUITE

### Description

A deciduous, perennial shrub with some species growing to and over three metres tall. Leaves are multi stemmed and feathery in appearance with two robust spines at the base. Flowers are small and greenish on short stalks and produce bunches of seedpods during summer. Stems are woody, brown to black in colour.

### Dispersal

Mesquite reproduces by seed and suckers. The pods are easily dispersed in water and transported through sand and gravel as contaminants.

### Look-alikes

Mimosa bush (*Acacia farnesiana*) is often mistaken for Mesquite as both plants are very similar in appearance. Flowers are globular orange to yellow in colour. Seed pods of Mimosa bush are considerably shorter in appearance (5-7 cm in length) than that of Mesquite, (up to 20cm in length). The pod of Mimosa bush also changes from green to black at maturity where as pods of Mesquite change from green to yellow at maturity.

### Control

Single plants can be controlled by grubbing out below the crown bud zone. Large colonies may require an integrated approach of mechanical removal followed by herbicide control of regrowth and seedlings.

## WOODY WEEDS

### Poplar (*Populus species*)



#### Description

Deciduous trees to 40m high with smooth grey or white bark, sometimes rough on the lower trunk. Leaves usually roughly triangular or diamond-shaped, on a long stalk, with a paler green or white underside. Flowers are in long drooping catkins and may be followed by tiny fluffy seeds.

Usually in damp soils or in river beds. Sometimes planted to stabilise river banks, but they may in fact cause erosion by creating dense thickets which divert flows against the opposite bank.

#### Dispersal

Mainly spread by root suckers around the parent plant, forming large thickets. White or silver poplar (*P. alba*) and Lombardy poplar (*P. nigra* var. *Italica*) sucker the most. Spread further when dumped material or branches detached in floods take root. Cottonwood (*P. deltoides*) and Lombardy poplar have been observed to cross-pollinate and produce hybrid offspring from seeds as willows do.

#### Look-alikes

No similar natives. White poplar can be confused with the exotic birches (*Betula* species) some of which also have very white bark, but birches do not have the white leaf underside and do not sucker. Not all poplars are invasive but it is best to plant natives for river bank stabilisation.

#### Control

Cut and paint, stem inject or spray smaller plants. Treat plants when in full leaf, in summer or early autumn. Poplars will sucker massively if cut and repeated cut and paint will be needed.

**Scotch or English Broom** (*Cytisus scoparius*) **NOXIOUS**

**Cape or Montpellier Broom** (*G. monspessulana*)

**Gorse or Furze** (*Ulex europaeus*) **NOXIOUS**

### Description

**Brooms:** Shrubs 1-4m high flowering in spring. Cape broom has leaves composed of three leaflets, like clover, and seed pods are hairy all over. English broom may be leafless or have leaves with one or three leaflets. The flowers are pure yellow or rarely have red or purple markings. English broom has a ribbed, five-angled stem and seed pods with hairy edges only.

**Gorse:** Densely spiny shrub to 3m high, with hairy ribbed stems. Young leaves with 3 leaflets, reducing to scales or spines on mature branches. Pods 1-2cm long, oval rather than flat and densely hairy.

### Dispersal

Dumping and in contaminated soil. Explosive release of seeds around parent plants. Seed can be carried in wool of sheep or on other animals feeding among plants during the seeding period.

### Look-alikes

Several broom species and cultivars are still sold in nurseries but should be avoided as all have weed potential. Spanish Broom (*Spartium junceum*) has leafless non-ribbed stems and pure yellow flowers. Gorse bitter pea (*Daviesia ulicifolia*) is a common native shrub of dry tableland forests. It has tough, sharply pointed leaves and yellow and brown flowers. It could be confused with gorse, but the leaves are shorter than gorse spines.

### Control

Cut and paint or spray. Smaller plants can be hand-pulled or dug. Seed is long-lived in the soil and seedling growth after removal of the parent plants will need follow-up. Fire could be used to stimulate germination of all soil-stored seed but must be followed by a comprehensive control program or it will just create a greater problem.

**WOODY WEEDS**



**ENGLISH BROOM**



**CAPE or MONTELLIER BROOM**



**GORSE or FURZE**

**Tree of Heaven** (*Ailanthus altissima*)

**NOXIOUS**

**Black Locust** (*Robinia pseudoacacia*)



TREE OF HEAVEN



BLACK LOCUST

### Description

**Tree of Heaven:** Deciduous tree to 20m high with smooth, grey bark. Compound leaves to 1m long with many leaflets in opposite pairs. There is a gland on a small lobe near the base of each leaflet. Crushed leaves have an unpleasant smell. Seeds are red, large and winged.

**Black Locust:** Deciduous tree to 20m high. There may be paired small thorns at the leaf bases. Compound leaves have 11-21 oval leaflets often with a notch at the tip. Cream pea flowers are in long hanging bunches in spring. Pods are 3-8cm long, fragile and papery.

Usually near buildings or on waste ground in towns.

### Dispersal

Mainly spreading by root suckers. Dumped material may take root. Root fragments can be spread by machinery. Seed spread by wind.

### Look-alikes

Another exotic, Honey Locust (*Gleditsia triacanthos*) is similar to black locust but has large branched thorns and longer, tougher pods. It also suckers freely.

### Control

Cut and paint, stem inject, basal bark or spray smaller plants. Plants will sucker from the roots when cut down or poisoned, so repeat treatment is necessary. Do not plough, bulldoze or cut without poisoning, as suckering will be massive.

Contact with tree of heaven bark and leaves may cause dermatitis in some people.

**Willow** (*Salix species*)

**NOXIOUS**

except *S. babylonica*, *S. x reichardtii*, *S. calodendron*



**Description**

Deciduous trees 4-20m high, single or multi-trunked. Leaves vary but most have finely toothed edges and a paler underside. Tiny flowers in erect catkins may be followed by fluffy seeds. A single plant usually only carries flowers of one sex.

Usually found along rivers where they can choke the bed and cause erosion. The dense shade they create suppresses all other vegetation. Willows were used to stabilise road batters in the Snowy Mountains but many have now been removed.

**Dispersal**

Willows spread when branches detached in floods or dumped material takes root but do not sucker from the roots. Seed is spread by wind and water but is only viable for a few days. Most willows are self-infertile in Australia (as only one sex was originally imported) but can hybridise with other species to produce fertile offspring. Black willow (*Salix nigra*) and NZ hybrids (*S. matsudana X alba*) are potentially the most invasive as both sexes were imported.

**Look-alikes**

No similar natives. Poplars have long drooping catkins and often sucker from the roots.

**Control**

Hand pull seedlings. Cut and paint or stem inject adult plants and spray smaller plants. Treat plants when in full leaf, in summer or early autumn. If cutting trees down paint both cut faces to prevent the top re-sprouting.



**Bathurst Burr/Noogoora Burr** (*Xanthium spp.*)**NOXIOUS****Description**

Erect annual herb usually about 1m high, single stemmed or branched. Narrow leaves have a downy white underside and a three-pronged spine at the base of each leaf. Flowers are inconspicuous, the female in the leaf axils and male flowers at branch tips. Two seeds are contained in each 10mm long spiny burr. Prefers moist soil in full sun on grazing land, roadsides or waste ground.

**Dispersal**

Burrs attach to livestock or clothing and are spread in mud, soil and water.

**Look-alikes**

Similar weeds, Californian burr (*X. orientale*) and Noogoora burr (*X. occidentale*) have slightly larger burrs, and larger lobed and toothed leaves similar to a grape leaf in shape and rough to the touch. Noogoora burr leaves are paler green below with purplish veins and leaf stalk. Californian burr leaves are green on both surfaces. Neither has spines.

Common thornapple (*Datura stramonium*) has a spiny seed capsule larger than that of the xanthium burrs and containing numerous seeds, not two. It also has large white trumpet flowers. All these plants are poisonous.

**Control**

Chip or spot spray prior to burrs forming. Once burrs have formed seed may mature even after plants have been cut. The cut plants will then need to be burnt. Selective herbicides can be used to remove them from pasture.

**Black knapweed** (*Centaurea nigra*)**NOXIOUS****Description**

A non-spiny member of the thistle group. Perennial herb to 1m high with hairy stems which may sprawl and root at the nodes. Mature stems become purple. Leaves may be smooth-edged, toothed or deeply lobed. Flowers are pink, in thistle-like heads, but the enclosing bracts are not spiny. They are distinctively comb-like, with deeply fringed margins, and black or dark brown.

Invades overgrazed pasture but not very competitive in healthy pasture. Unpalatable and reduces carrying capacity. Prefers cool climates and currently only established in parts of Victoria and Tasmania.

**Dispersal**

Seed spread in soil and attached to machinery, vehicles, livestock. Wind dispersal not very effective.

**Look-alikes**

Perennial thistle (*Cirsium arvense*) has the most similar flower heads, being pink without spiny bracts, but it has spiny leaves.

**Control**

Chip or spot spray prior to seeding. Selective herbicides can be used to remove knapweed from pasture.



**Blue Heliotrope** (*Heliotropium amplexicaule*)**NOXIOUS****Description**

A prostrate perennial herb 15-30cm high, with many branched stems radiating from a woody rootstock with purple flowers, reproducing from seed and root buds.

Stems are dull green, hairy and prostrate up to 1 metre in length. Leaves are dull green alternate 3-7 cm long with wavy margins, hairy on both sides. Flowers are purple to lilac with a yellow centre, tubular in nature and up to 5mm in length when fully opened.

**Dispersal**

Spread is by rapid and abundant seed set and from fragmentation of root buds. Cultivation/mechanical disturbance of infested areas assist in the spread of Blue Heliotrope. Seeds readily adhere to fur and clothing, and can remain unharmed through the digestive tract of most animals. Seeds may also move via water flow and in mud sticking to hooves, vehicles and is found as a contaminant of grain and hay.

**Look-alikes**

Paterson's Curse (*Echium plantagineum*), Common Heliotrope (*Heliotropium europaeum*), Trailing Lantana (*Lantana montevidensis*) and *Verbena* spp. can all look similar depending on their stages of growth.

**Control**

Cultivation for the control of Blue Heliotrope is generally discouraged, as it is thought to aid in the spread of root fragments and stimulate otherwise dormant seeds. A combination of spring summer cultivation to control seedlings with follow up herbicide applications is thought to be effective. Herbicide can be an effective tool combined with the establishment of deep rooted perennial pastures to provide competition.

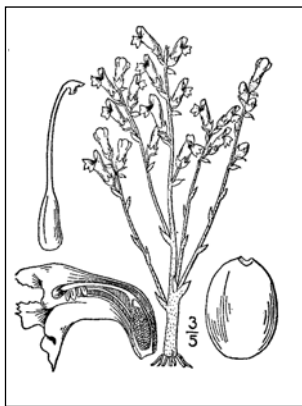
## HERBACEOUS

**Broomrape** (*Orobanche minor*)

**NOXIOUS**

**Branched Broomrape** (*Orobanche ramosa*)

**NOXIOUS**



### Description

**Broomrape:** Erect, brown, hairy, single-stemmed herb 10-40cm high. Leaves are reduced to scales. Flowers are tubular, grey-mauve and snapdragon-like, 9-18mm long and attached to the stem in the axil of a reduced scale-like bract.

**Branched Broomrape:** A similar but multi-stemmed plant 10-30cm high, either yellow-stemmed with white flowers or brown-stemmed with mauve flowers with a white throat.

Both are parasites of broadleaf herbs including crops and legumes.

### Dispersal

Fine seed is spread in wind, water, animal dung and soil. Cultivation spreads fragments which can regrow. Branched broomrape (*Orobanche ramosa*) has been recorded in South Australia but not yet in NSW.

### Look-alikes

Could be confused with the native potato orchid (*Gastrodia procera*), but the orchid's flowers hang away from the stem on distinct stalks.

### Control

Small broomrape is only a minor weed which seldom persists. Branched broomrape is a notifiable weed. It is a potentially major weed of broadleaf crops. It can flower and seed very rapidly. If you think you have found this plant do not pick it as you may spread the seed. Mark the site and notify your local Council weed staff and NSW DPI immediately.

**Boneseed** (*Chrysanthemoides monilifera* subsp. *Monilifera*)**Description**

Boneseed is an erect woody evergreen shrub 2-3 metres tall. Leaves are fleshy with toothed edges. Young leaves are rounder and often covered in white cottony down. Flowers are bright yellow, and have five to eight petals growing in clusters. Fruits are round green berries ripening to black. Each fruit contains one hard bone coloured seed.

**Dispersal**

Boneseed reproduces by seeds. These seeds are spread by birds, rabbits, foxes, and other animals. Seeds can also spread via waterways, in soil or in dumped garden waste.

**Look-alikes**

Bitou bush grows in similar conditions looking similar with bright yellow flowers, but has a sprawling habit and with more rounded, less toothed leaves.

**Control**

Destroy new infestations before they flower or set seed. Boneseed is easy to hand pull or dig up when small. Larger plants can be cut down and herbicide applied to stumps immediately after cutting. Fruiting plants should be bagged and disposed of at the tip.

**Buchan Weed or Hairy Mustard** (*Hirschfeldia incana*)**Description**

Erect branched annual or biennial herb to 1m high, bristly on stems and leaves. Leaves lobed, grey-green, reducing in size up the stem. Yellow 4-petalled flowers to 16mm across and lumpy cylindrical seed pods to 15mm long, held closely against the stem.

Prefers full sun on roadsides or waste ground but can invade degraded pasture. It is palatable to stock when young and taints meat and milk.

**Dispersal**

Seed is usually spread in mud and soil on machinery, or through slashing.

**Look-alikes**

Several weeds in the Brassica family are very similar including wild radish (*Raphanus raphanistrum*) and hedge mustards (*Sisymbrium officinale* and *S. orientale*). Yellow cress (*Rorippa palustris*) grows in wet sites and is hairless.

**Control**

Selective herbicide can remove this weed from pasture. For small infestations, chip or spot spray prior to seeding.

**Dodder** (*Cuscuta* species)**NOXIOUS****Description**

Annual leafless yellow (sometimes brown or reddish) twining plants which attach by suckers to various broadleaf plants, particularly legumes such as lucerne, some crop plants and other weeds such as noogoora burr. It is parasitic on these plants and reduces growth and yields. The yellow colour of golden dodder (*Cuscuta campestris*) makes it highly visible, but other species may be less conspicuous. Tiny white flowers occur in dense or open clusters along the stems. The photo is of the native *Cuscuta tasmanica* which has the flowers more spread out along the stems.

**Dispersal**

Fine seed is spread in wind, water, animal dung and soil. Dodder seed can be a contaminant of legume seed or of hay. Cultivation spreads fragments which can regrow.

**Look-alikes**

The dodder group includes some native and some exotic species, but the natives are unlikely to parasitise crop plants. The unrelated devil's twine (*Cassutha* species) is a more robust native parasitic plant with brownish stems that grows over shrubs. Flowers are in small spikes and fruits are berries about 8-15mm across. It is not a threat to crops or pasture.

**Control**

Prevent its introduction by buying only certified seed. Do not feed infested hay. Quarantine the infestation from grazing, slashing etc and burn, spraying first if necessary to make it flammable. Do not slash as this will only spread the infestation. Use the site for grasses or grain crops only for 5 years and control broadleaf weeds which are an alternative host. This should exhaust the seed supply in the soil but continued vigilance will be needed.

## HERBACEOUS

**Fennel** (*Foeniculum vulgare*)

**Hemlock** (*Conium maculatum*)

**NOXIOUS**



### Description

**Hemlock:** Robust annual or biennial herb 1-2m high with zigzagging stems that are whitish or bluish, finely blotched brown or purple and hollow. Leaves are finely divided and feathery. Flowers are white and carried in umbrella-shaped heads. Hemlock is said to have a "mousy" smell when crushed.

**Fennel:** Robust perennial 1-2m high with multiple stems arising from a woody crown. Stems bluish with a pale bloom. Leaves feathery with thread-like segments. Flowers yellow. The whole plant smells of aniseed.

Both grow on unused land such as roadsides and river banks. Fennel is grazed without ill-effect and seldom persists where stock have access. All parts of the hemlock plant are poisonous to humans and livestock. It also taints milk and can affect yield.

### Dispersal

Seed is spread by water, machinery or vehicles or in contaminated soil.

### Look-alikes

None.

### Control

Hand chip young plants or spot spray before plants elongate into the flowering stage. Slashing just before flowering may kill the plants or repeat slashing of regrowth may be needed.

## Fireweed (*Senecio madagascariensis*)



### Description

Low branching annual herb with 13-petalled flowers and bright green toothed or smooth-edged leaves. It is toxic to stock, causing progressive liver damage. It is not readily grazed except by sheep and goats which tolerate the toxins better than other stock.

Will grow in pasture, on road verges and in native grassland, woodland or forest.

### Dispersal

Seed is wind-blown and possibly moved around in soil and on vehicles.

### Look-alikes

There are many other weedy yellow daisies, which mostly consist of a single rosette and flower stalk rather than having a branching habit. *Senecio Lautus* ssp *lanceolatus* is very similar however it has a weak trailing growth habit more deeply toothed leaves.

### Control

Hand-pull as soon as the plants become visible by beginning to flower. Bag the whole plant for safe disposal or just the flowers and seed heads. Check for seedlings in the vicinity of the more visible plants. Large infestations can be boom sprayed with a selective herbicide. Sheep and goats may reduce seed set by grazing.



### Great Mullein or Aaron's Rod (*Verbascum thapsus*)



#### Description

Erect biennial herb 1-2m high, single stemmed or rarely branched. A basal rosette of large woolly grey-green leaves produces a tall flowering stem with leaf size decreasing up the stem. Flowers are yellow and up to 3cm across. Numerous tiny seeds are contained in each brown woolly capsule.

Originally a garden plant, it is now a widespread agricultural weed. The large rosettes cover a lot of ground and reduce carrying capacity. Prefers full sun on grazing land, roadsides or waste ground. Most likely to invade after soil disturbance or long-term over-grazing.

#### Dispersal

Burrs attach to livestock or clothing and are spread in mud, soil and water.

#### Look-alikes

Twiggy mullein (*Verbascum virgatum*) has a similar growth habit and flowers but leaves are bright green with toothed edges and only sparsely hairy. Moth mullein (*V. blattaria*) is similar to twiggy mullein but has white flowers and is much less common.

#### Control

Unlikely to compete well with improved pasture on fertile soils. Elsewhere, chip or spot spray prior to flowering. Chip deeply to remove the crown or plants will regrow.



**Hardhead Thistle** (*Acroptilon repens*)**NOXIOUS****Description**

An erect perennial herb growing between 40cm and 100cm in height. Stems are covered with soft grey hairs with purple to pink flowers and are single units at the end of the branches. The rootstock has longevity and can remain in the ground for extended periods of time.

**Dispersal**

Plants reproduce by seed and creeping roots. Spread is by wind, water, vehicles and machinery contaminated with mud.

**Look-alikes**

Can be confused with many other purple flowering thistles such as Spear Thistle (*Cirsium vulgare*) and Scotch Thistle (*Onopordum acanthium*).

**Control**

Cultivation is ineffective due to the risk of further spreading root fragments. Competition with a vigorous perennial pasture is thought to assist in the control of Hardhead Thistle along with the use of herbicide as part of an integrated approach.

**Hawkweeds** (*Hieracium* species)**NOXIOUS****Description**

Perennial herbs with a basal rosette of hairy leaves and branched flowering stem which may carry one or two small leaves. Orange hawkweed (*Hieracium aurantiacum*) has orange daisy flowers which are surrounded by hairy blackish bracts. They are carried in a dense cluster at the tip of the flowering stem.

Hawkweeds are European plants which are weedy in North America and New Zealand. They are highly invasive in pasture and native grasslands in cool moist climates. Although a prohibited import in Australia they occasionally appear in nurseries. *Pilosella aurantiaca* is another name under which orange hawkweed has been sold. Orange hawkweed escaped from a garden in a Victorian ski resort into native alpine vegetation and an infestation was discovered in Kosciuszko National Park in 2003, where efforts are being made to eliminate it.

**Dispersal**

Fine wind-spread seed and by runners, forming dense mats.

**Look-alikes**

The blackish hairy bracts on the buds and orange "petals" are distinctive to orange hawkweed. In growth form it is similar to a number of other weeds in the daisy family such as smooth hawkbeard (*Crepis capillaris*) and the native daisy *Picris angustifolia* but these are yellow flowered.

**Control**

Notify your local Council weeds staff and NSW DPI if you see plants described as hawkweeds or *Hieracium* for sale or in a garden or if you suspect an infestation. Get plants identified and, if necessary, removed promptly. Prevent seeding or collect and destroy seed.

**Horehound** (*Marrubium vulgare*)**NOXIOUS****Description**

Bushy perennial aromatic herb to about 30cm high. Near-circular opposite grey-green leaves are velvety and wrinkled with toothed edges. Small white flowers are carried in dense clusters in the axils of the upper leaves. Fruits are burrs each with up to 4 seeds.

Prefers full sun and disturbed ground on grazing land, roadsides or waste ground. Old rabbit warrens and sheep camps are the most likely sites of invasion. Tolerates drought and poor soils and spreads when overgrazing or drought removes more palatable species. Not very palatable to stock but taints meat if grazed.

**Dispersal**

Burrs attach to animals, clothing, car tyres or are spread in mud, soil and water and in animal dung.

**Look-alikes**

The related wild sage (*Salvia verbenaca*) is another common aromatic weed with a less bushy habit. Its leaves are oval and more deeply toothed, less woolly and on longer stalks. Flowers are blue-purple in terminal spikes (photo on page 46).

**Control**

Chip, spot spray, or boom spray larger infestations prior to seeding or burn plants after chipping or spraying if seed is present. Fire will stimulate germination of most seed for further treatment. Vigorous pasture is unlikely to be invaded so avoid creating bare ground.

**Onion Weed** (*Asphodelus fistulosus*)**NOXIOUS****Description**

An erect herb growing to 80 cm in height reproducing by seed. Leaves grow from the base with hollow stems that protrude from the leaves. Flowers are white or pink with reddish stripe down the petals. Fruit is found near the top of the stem and contain 1-2 seeds.

**Dispersal**

Spread is by machinery, vehicles, animals, wool, clothing and by water. Seed can remain viable in the soil for extended periods of time.

**Look-alikes**

Some of the lilies such as the Leek Lily (*Bulbinopsis semibarbata*) and the Sand Lilly (*Corynotheca lateriflora*) are similar in appearance to Onion Weed but can be distinguished by their yellow flowers.

**Control**

Isolated plants may be hand pulled or hoed before seeding. Cultivation followed by the establishment of a perennial pasture such as Lucerne can also be effective. Herbicide can provide control in smaller infestations, but is not as effective in larger infested areas.

**Parthenium Weed** (*Parthenium, hysterophorus*)**NOXIOUS****Description**

An erect aromatic annual summer growing herb to 1.5 metres tall, with a deep tap root. Pale green in colour, with slightly hairy leaves. Flowers are creamy white in appearance growing in clusters with five distinct lobes.

**Dispersal**

Spread is by seed and assisted by wind and water. Movement in sheet water flow is particularly important as indicated by infestations in drainage areas and floodplains. Long distance spread is thought to be caused by animals, vehicles, farm machinery, and in mud.

**Look-alikes**

Bishop's Weed (*Ammi majus*) has white terminal flowers that are held at the same level by short stems similar to Parthenium weed, but branches radiate from a single plant.

Cobbler's Peg (*Bidens subalternans*) looks very similar to Parthenium at the seedling stage but can be distinguished by its slender yellow flowers when more mature.

Hemlock (*Conium maculatum*) is similar in appearance to Parthenium with white terminal flowers held in an umbel shape.

**Control**

Parthenium weed is susceptible to a variety of herbicides and timely spraying can assist in reducing the next generation of seedlings. Summer fallowing and a winter cropping program can also assist in reducing germination of the plant. Improved machinery wash down procedures and hygiene can also greatly reduce new germinations of seedlings.

## HERBACEOUS

**Prairie Ground Cherry** (*Physalis viscosa*)

**NOXIOUS**

**Perennial Ground Cherry** (*Physalis virginiana*)

**NOXIOUS**



### Description

Prairie Ground Cherry is an erect perennial plant growing 25-60 centimetres high. Stems are branched, spreading, longitudinally ribbed with very short hairs. Leaves are light green in colour, with yellow bell shaped flowers 2-3 centimetres in diameter. Fruit is enclosed in a bladder-like case about 2-2.5 centimetres in diameter, and is an orange globular berry when ripe.

### Dispersal

Prairie Ground Cherry is spread by cultivation, with pieces of root as small as 1.5cm in length having the ability to grow into new plants. The fruit is effectively spread by wind and water as well as birds and other animals. Machinery and vehicles are also thought to be efficient means of spread.

### Look-alikes

Virginia Ground Cherry (*Physalis virginiana*) is a similar species, however it is somewhat larger in appearance with bigger leaves and reddish stems.

### Control

Control can be difficult due to the extensive root system reaching up to 1 metre under the soil surface. Cultivation is not effective as it breaks up root fragments aiding in the plants spread. Chemical control can be successful when applied at early flowering stage.



**Silverleaf Nightshade** (*Solanum elaeagnifolium*)**NOXIOUS****Description**

Silverleaf Nightshade is an erect silvery to grey deep rooted perennial plant. It features short brown spines on stems and leaves. Flowers are purple or white with five petals. Fruit are green and white striped berries turning yellowy orange when ripe.

**Dispersal**

Spread is by root pieces and seed. All parts of the root are capable of forming new plants. Wind, water, animals and vehicles also spread seed.

**Look-alikes**

Quena *Solanum esuriale* Lndl. Is often mistaken for Silverleaf Nightshade but is generally smaller in appearance.

**Control**

Silverleaf Nightshade is very difficult to control due to its extensive root system and repeat application of herbicide is required. Cultivation is not an effective control method, as it assists in spreading root pieces into clean areas. The use of both herbicides and competitive perennial pastures can greatly reduce plant numbers over time.



### Description

An erect annual or short lived perennial herb, to 75 cm tall reproducing by seed. Multiple stems arise from the base with silvery blue-green leaves to 20cm in length. Yellow ovate flowers occur to 1.5cm long. Two types of seed are produced – inner seeds that are light fawn in colour, and outer seeds dark brown and mottled in appearance. St. Barnaby's Thistle has a deep taproot about 20cm long with numerous laterals.

### Dispersal

Spread is mainly by seed with a pappus (wing) facilitating wind dispersal. Spread can also be by water, in seed, wool, fodder and by vehicles and machinery.

### Look-alikes

Other thistle species can be mistaken for St. Barnaby's Thistle such as Saffron Thistles (*Carthamus lanatus*) and Mexican Poppy (*Argemone ochroleuca*) both having similar characteristics such as yellow-cream flowers and silvery green/grey stems.

### Control

Shallow cultivation may control small rosettes and seedlings, but repeated working may be required to deal with subsequent germinations. Slashing may also be affective, with timing critical to avoid further spread of mature seed through slashing activities.

There are several herbicides registered for the control of St. Barnaby's Thistle which is best controlled at the seedling rosette stage, but a rapidly growing competitive crop or pasture is regarded as the best defence.



**St John's Wort** (*Hypericum perforatum*)**NOXIOUS****Description**

Perennial herb with small pale green leaves arranged in opposite pairs. If the leaves are held up to the light, tiny clear oil dots can be seen. Five-petalled flowers are about 20 mm in diameter. Flowering is in summer. Seed is tiny and contained in small brown papery capsules. The plant dies back to the rootstock over winter and does not begin growing again until spring.

Grows in pasture and on road verges. Very invasive in grassy woodlands. The plant is poisonous to stock causing photo-sensitisation. The faces and mouths become itchy and raw, preventing feeding. However stock can consume small amounts without harm.

**Dispersal**

Seed sticks to animals or vehicles, is spread in contaminated soil, or in hay or chaff. Each plant also produces underground runners which can be spread by cultivation.

**Look-alikes**

The native *Hypericum gramineum* is very much smaller with flowers only 10mm in diameter. Several larger *Hypericum* species are used as garden plants.

**Control**

Very small infestations can be hand dug taking care to remove all of the underground stems and dispose of them carefully, or spot spray. Boom spray or cultivate for large infestations. Use tined implements to avoid spreading root fragments. St John's wort does not tolerate strong competition from healthy pasture so avoid over-grazing and ensure rabbits are controlled. Well timed grazing by goats or sheep can assist with control.



### Description

There are many thistles, all annual or biennial weeds in the daisy family. The features they share are a basal rosette which produces a simple or branching flowering stem, leaves which are usually spined on the toothed or lobed margins and tiny flowers which are clumped into terminal heads usually surrounded by spiny bracts. Flowers are pink, purple or yellow. The stems of some species are winged.

### Dispersal

Seed dispersed by wind, water, roadside slashing, contaminated soil or hay and on stock.

### Look-alikes

Mexican poppy (*Argemone ochroleuca*) has blue-green spiny leaves and a cream poppy-like flower. Wild teazel (*Dipsacus fullonum*) has more elongated cylindrical heads of mauve flowers with long spiny bracts at the base, and short prickles on stems and the vein on the leaf underside, but not on leaf margins. Both are weeds, unrelated to true thistles.

A similar looking but unrelated native plant is the blue devil (*Eryngium rostratum*) which is a rare plant of native grasslands. It has a distinctively open-branching flowering stem and spiny globular flower heads. Both heads and stems are blue-purple at maturity. Leaves are in a basal rosette with long narrow teeth but no spines.

### Control

Chip or spot spray small infestations prior to seeding. Boom spray larger infestations with a selective broad-leaf herbicide. Avoid soil disturbance and over-grazing to maintain a vigorous competitive pasture. Goats provide good control of thistles.

**THISTLES**

**HERBACEOUS**



**NODDING**



**SAFFRON**



**NOXIOUS**

**STAR**



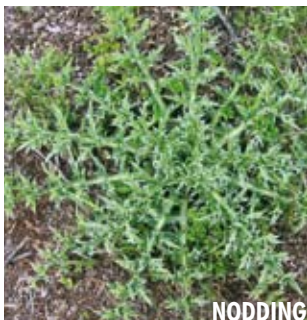
**BLACK or SPEAR**



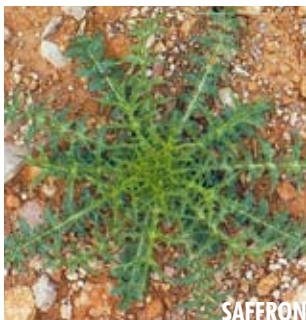
**VARIEGATED**

**HERBACEOUS**

**THISTLE ROSETTES**



**NODDING**



**SAFFRON**



**STAR**



**PERENNIAL or CANADIAN**



**BLACK or SPEAR**



**VARIEGATED**



**SCOTCH**



**ILLYRIAN**



**Wild Radish** (*Raphanus raphanistrum*)**NOXIOUS****Description**

An erect mainly annual herb to 1 metre in height with a strong turnip odour when crushed, reproducing by seed. Stems are often bluish green often red at the base to 100cm high. Leaves are green to blue-green, 30 cm in length and up to 10cm in width. Flowers are usually creamy white or pale yellow with occasional pink flowers occurring.

Petals are arranged in groups of four, with violet veins to 4cm in diameter. Fruit develops into a 2 celled cylindrical pod to 8cm in length, ribbed in appearance and constricted between seeds. Seeds are reddish to yellowish brown broadly ovoid to 4mm in length.

**Dispersal**

Spread of wild radish is mainly due to the movement of seeds by way of wind, water, animals and man. The principle method of spread is by the contamination of agricultural produce.

**Look-alikes**

Many of the closely related brassica species have many similarities. Canola, Wild Mustard, Wild Turnip and Buchan Weed are all similar in appearance and habit.

**Control**

Hand pull/remove single and scattered plants prior to seeding. Repeated cultivation can be a useful tool, however erosion issues need to be considered. A successful competitive cropping/pasture program is the best defence, with an integrated herbicide program carried out at the early stages of crop emergence.

### Cane Needle Grass (*Nassella hyalina*)

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#### Description

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A perennial tussock-forming grass with a flower stem standing erect like a cane. Cane Needle Grass is green to lime-green in colour, growing to a mature height of up to 1.5 metres.

Leaves are flat or rolled slightly inwards up to 200mm long. Seeds are 4-5mm long and have 35-40mm long bristle like awns.

#### Dispersal

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Spread is by way of seeds, which are very sharp and cling readily to fur clothing, and machinery. Soil movement from infested areas can also spread seed to clean areas. Cane Needle Grass also produces hidden seeds called "cleistogenes" which are formed in the stems. These hidden seeds enable the plant to reproduce even if it is heavily grazed, slashed or burnt.

#### Look-alikes

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Many of the other *Nassella* species look similar, in particular Chilean Needle Grass (*Nassella neesiana*) and Serrated Tussock (*Nassella trichotoma*). The native Spear Grass species (*Aurolastipa species*) is also similar in appearance to Cane Needle Grass.

#### Control

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Little research has been undertaken on how to control this relatively new weed incursion. Herbicide used on other *Nassella* species is considered effective in controlling Cane Needle Grass. Grazing, slashing and the use of fire are not as effective, due to the presence of cleistogenes, or hidden seeds located deep in the stems.

**Chilean Needle Grass** (*Nassella neesiana*)**NOXIOUS****Description**

Tall grass to 1m high, with dark green flat to slightly in-rolled ribbed leaves to 5mm wide. The joints of the flowering stems are bent with fine short white hairs. Seed is sharply pointed and red-purple when young, 6-10mm long, with a long (40-90mm) awn. The best distinguishing feature is the membranous collar (corona) at the point where the awn attaches to the seed. Awns twist when mature and may tangle together (although many native spear grasses also do this).

Very invasive in pasture and on roadsides and other waste ground, to date only in wetter parts of the region.

**Dispersal**

Sharp-pointed seeds attach to animals and clothing, also in soil on machinery and vehicles. Most spread on the Southern Tablelands has been by roadside slashing.

**Look-alikes**

There are many native spear grasses (*Austrostipa* species) with similar pointed seeds with a long, curved or twice-bent awn but many have very narrow leaves. The most similar is tall speargrass (*Austrostipa bigeniculata*) which also has broad leaves. It has a few short erect hairs at the seed/awn junction but not a membranous corona. The leaves of Chilean Needle Grass tend to droop as they grow longer, while native spear grasses retain straight, more erect leaves.

**Control**

Dig or spray. Seed is long-lived in the soil so prevention of seeding is vital. Mowing with a catcher mower during flowering will reduce seed set but the clippings must be burnt. This grass can also produce seed hidden within the bases of the flowering stems so mowing to prevent seeding will be only partially effective. Dug out plants should be burnt to destroy this hidden seed. Just destroying the obvious seed heads may not be sufficient.



**Coolatai Grass** (*Hyparrhenia hirta*)**NOXIOUS****Description**

A tussock forming grass, which can grow up to 1.5 metres tall. Leaves are grey-greenish in colour and flowering occurs in spring and summer. Coolatai Grass is an aggressive spreader, and colonizes roadsides and natural areas rapidly by excluding native and more desirable species.

**Dispersal**

Spread is mostly by thousands of tiny sticky seeds which adhere readily to animals, farm machinery, and motor vehicles. Slashing of roadsides has proven to be a major method of spread in the Eastern Riverina.

**Look-alikes**

The native Kangaroo grass (*Themeda australis*) looks similar in height and in the seed head.

**Control**

A competitive pasture is the best defence against Coolatai Grass. Small areas may be removed by hand. Chemical control may be undertaken under special permit in larger infested areas.

**Johnson's Grass** (*Sorghum halepense*)**NOXIOUS****Description**

A summer growing perennial sorghum up to 2 metres tall. Leaves are long with a prominent white midrib and an open seed head. Seeds are usually dark brown or black when mature and unlike Forage Sorghum, has rhizomes.

Johnson's Grass, like all sorghums, can be toxic to livestock especially during periods of new growth.

**Dispersal**

Spread is by way of seed and root pieces and the plant can be a pollen contaminant of sorghum and other crops. It is also a safety hazard along roadsides restricting vision.

**Look-alikes**

Columbus Grass (*Sorghum x alnum*), Sorghum (*Sorghum bicolor*) and Paspalum (*paspalum diatatum*) are commonly mistaken for Johnson's Grass.

**Control**

Control of Johnson's Grass is difficult due to its ability to regenerate from rhizomes, resulting in cultivation being an ineffective form of control. Slashing prior to seed set has proved to be of benefit in some situations, allowing more desirable grasses to dominate. Herbicide control is effective in crop and non-crop situations, as well as competitive pasture program.

**Serrated tussock** (*Nassella trichotoma*)**NOXIOUS****Description**

Tussock grass to 0.5m with erect bright yellow-green rolled leaves less than 1mm wide, with a 1mm long hairless white flap (ligule) where the leaf joins the sheath (pull the leaf back from the stem to make it visible). The long, branched seed heads can weep to the ground. The young seeds are enclosed in a red sheath, giving the flowering plant a pink fluffy look. The seed is tiny and almost round with a fine thread-like awn attached off-centre at one end.

Most aggressive in over-grazed pasture or after soil disturbance but it can invade any sort of grassy vegetation and adjacent bush. It has little feed value and reduces stock carrying capacity as well as reducing biodiversity in native vegetation.

**Dispersal**

Wind. The entire seed head snaps off and can blow long distances, often piling up against fences. In the gut of stock, in contaminated feed, in soil, on vehicles and by water.

**Look-alikes**

Natives, blown grass (*Agrostis avenacea*) and panic (*Panicum effusum*) have seed heads which snap off and blow around, but both have wide leaves, and neither has the red appearance. Corkscrew grass (*Aurolastipa scabra*) and native poa tussocks (*Poa* species) can look similar with the same erect leaf growth and very fine foliage but they have erect seed heads which stay on the plant after seed has been shed. The ligule of *Poa* is invisible to the naked eye and under magnification it is hairy on the back.

**Control**

Dig prior to seeding, spot or boom spray. For large infestations cultivate or spray and direct drill to establish competitive pasture species. It is important to maintain other pasture plants in vigorous condition as serrated tussock seedlings are not very competitive in dense pasture. Control of rabbits and of stock grazing pressure is crucial.

**Spiny Burrgrass** (*Cenchrus incertus*, *C. longispinus*)

**NOXIOUS**



### Description

Two very similar erect to spreading annual grasses to 60cm high. Stems are branching and may root if they contact the soil. Leaves to 20cm long and 5-8mm wide, flat and hairless but finely serrated. Narrow linear seed head with up to 40 green to straw-coloured burrs. Burrs have 11-43 spines (*C. incertus*) or over 40 spines (*C. longispinus*) and contain 1-3 seeds.

Prefers disturbed sites on sandy infertile soils. The burrs reduce the value of wool and hides and make affected animals painful to handle. They can cause ulcers in the mouth of stock.

### Dispersal

Burrs cling to animals, clothing, vehicle tyres and machinery. In contaminated hay.

### Look-alikes

The burrs are quite distinctive. The lush appearance of the plant prior to flowering is also quite unlike native grasses of the Riverina. Immature plants appear similar to *Paspalum* (*Paspalum scorbiculatum*) and *Truncata* spp.

### Control

Dig or spot spray before seeding. Seed is short-lived in the soil so prevention of seeding for 3 years can eradicate this weed. Once a dense infestation has developed, cultivation and establishment of a vigorous perennial pasture may be needed, but may be difficult on the poor soils this weed prefers. Not very competitive in pasture, particularly lucerne.

**Alligator Weed** (*Alternanthera philoxeroides*)**NOXIOUS****Description**

This introduced South American aquatic weed forms dense floating mats with masses of interwoven hollow stems growing in waterways or swampy areas. It can also live on land and spread up to 15 metres in a waterway.

Leaves are green, elongated and opposite on the stems. Plants have white solitary flowers and clear green to red hollow stems.

**Dispersal**

The plant is readily spread by water birds, in hay and turf, in mud on earth moving machinery and by vehicles and livestock.

**Look-alikes**

Similar looking plants are Water primrose (*Ludwigia peploides* ssp.) and Smartweed (*Persicaria decipiens*).

Water Primrose is found on edges of lakes, streams and channels but can also extend out onto the water surface. Leaves are egg shaped and a single yellow flower distinguishes it from Alligator weed.

Smartweed is usually found on creeks and river banks, and around margins of lagoons swamps and channels. It can be distinguished from alligator weed by a terminal flower head with pink flowers along a spike and alternate leaves often with a dark blotch in the centre.

**Control**

Control and eradication of Alligator weed is extremely difficult. Tillage can actually promote its spread. Mechanical removal on waterways gives temporary control but can also further spread fragments via harvesting machinery. Biological control has proven effective in the USA, but proving to provide mixed results in Australia.

**Sagittaria** (*Sagittaria graminea*)**NOXIOUS****Description**

An emergent aquatic perennial herb, rooted in flooded areas to 45cm or marshy areas associated with rivers and streams. *Sagittaria* is erect and upright with stems 5-20cm long, having leaves that are ovate or triangular arrow-like in shape 10-25cm long.

Flowers are 3cm in diameter and white occasionally pink in colour, arranged in a 3 flowered whorl. Roots consist of a short fleshy rootstock rising to fibrous branching roots and fleshy rhizomes.

**Dispersal**

Spread is mainly due to rhizomes and tubers extending the area of existing colonies. Occasionally floating mats are formed that break away from parent material floating downstream to form new colonies. Most seed drops near the original colony, but it is thought further spread may occur from ducks that may eat and excrete viable seed that may flow further down stream.

**Look-alikes**

The closely related *Sagittaria montevidensis* is similar in appearance to *Sagittaria graminea* but is taller and less widely distributed.

**Control**

Mechanical ploughing in winter is thought to expose the reproducing propagules to frost which causes desiccation in irrigation areas such as supply channels, however herbicides are thought to be more effective. Biological control has been attempted in some countries, but with little success.



### Description

A free floating aquatic perennial fern with slender branching rhizomes just below the water surface. Leaves range from 2-25 cm long and are pinnate in structure. They appear light green to brown if emerged from the water, with submerged leaves brown in colour.

Occurs on still and slowly flowing water, and can smother large areas of water causing problems to other plants and aquatic animals. It can block irrigation equipment and pumping apparatus and reduce the use of waterways for industry and recreation.

### Dispersal

Spread is mainly by vegetative means in aquatic systems by movement of plants by wind and water currents including floods. New plants are often formed when old rhizomes break away and node growth is stimulated by mechanical severing. Other methods of spread include moving of plants intentionally as ornamentals or via boats and other implements.

### Look-alikes

*Azolla* (*Azolla filliculoides/pinnata*) has smaller leaves in an alternate form, as well as Duckweed (*Spirodela spp.*) a native species with an elliptic leaf shape light green in appearance. Both can be mistaken for *Salvinia* due to their free floating habit.

### Control

Due to the fragmented habit of *Salvinia* as its method of dispersal, control is difficult. Mechanical removal via draglines and scoops is inefficient and expensive on its own, but can be useful as part of an integrated approach. Chemical control can be effective, but wetting the plant can be difficult. Biological control has proven successful with good results in parts of Australia following the release of the weevil *Cyrtobagous salviniae*.



**Water Hyacinth** (*Eichhornia crassipes*)**NOXIOUS****Description**

A free-floating aquatic plant growing in deep to shallow water or in mud, that threatens water use in general. Infestations can make water unsuitable for domestic and stock use, choke irrigation systems, block drains, hinder navigation and impact on natural areas and wildlife.

Water Hyacinth is easily recognised by its bright shiny pale green fleshy leaves on swollen bladder like stems. Attractive mauve flowers appear in summer.

**Dispersal**

Patches spread very rapidly by the production of daughter plants on stolons. These new plants produce further stolons within a few weeks and it is claimed that a single plant can produce enough growth to cover 600 square metres in a year.

Dispersal also occurs via water-borne seeds, and seeds that stick to the bottom of the feet of birds, in particular, migratory birds. It is also thought that human encouragement of the plant in backyard ponds and lakes is a major cause of spread in southern Australia, with the attractive flowers appearing to be that of a harmless ornamental.

**Look-alikes**

Flowers are similar to the cultivated terrestrial Hyacinth (*H. orientalis*)

**Control**

Water Hyacinth is difficult to control, with a variety of different methods such as costly mechanical removal operations and the use of herbicides. Eradication often is not possible due to water Hyacinth growing in areas with poor access. Some success has occurred from the use of biological control agents, but their establishment is patchy.

## Common garden escapees

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These plants have either shown they are able to naturalise in the region already but are not widespread yet, or they have become serious weeds in other areas with similar climate.

If they are already in your garden please think about replacing them with something less likely to spread. Plants with seed which is spread by birds are in bold. They are particularly likely to spread into bush.

You may notice that two commercial crop plants have been included, olive and radiata pine. Both these species are quite invasive so please think carefully before you plant them and do not plant them unless there is no feasible alternative. Many other conifers will do as well as pines as a windbreak and will not spread. Local native trees could also be used.

### Trees

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Alders	( <i>Alnus</i> species)
<b>Canary Island Date Palm</b>	( <i>Phoenix canariensis</i> )
<b>Cherry laurel</b>	( <i>Prunus laurocerasus</i> )
<b>Cherry plum</b>	( <i>Prunus cerasifera</i> )
<b>Chinese pistachio</b>	( <i>Pistacia chinensis</i> )
Cootamundra Wattle	( <i>Acacia baileyana</i> )
Desert ash	( <i>Fraxinus angustifolia</i> )
English elm	( <i>Ulmus procera</i> )
Honey locust	( <i>Gleditsia triacanthos</i> )
<b>Olive</b>	( <i>Olea europaea</i> )
<b>Peppercorn</b>	( <i>Schinus areira</i> )
Radiata pine	( <i>Pinus radiata</i> )
Rhus	( <i>Toxicodendron succedaneum</i> )
Sycamore maple	( <i>Acer pseudoplatanus</i> )
Tree lucerne or tagasaste	( <i>Chamaecytisus palmensis</i> )

### Shrubs

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<b>African olive</b>	( <i>Olea europaea</i> ssp <i>africanus</i> )
Broom	( <i>Cytisus</i> hybrids)
<b>Common elder</b>	( <i>Sambucus nigra</i> )
Dwarf broom	( <i>Cytisus racemosus nana</i> )
<b>Himalayan honeysuckle</b>	( <i>Leycesteria formosa</i> )
Holly	( <i>Ilex aquifolium</i> )
<b>Indian hawthorn</b>	( <i>Raphiolepis indica</i> )
<b>Mahonia</b> or <b>Oregon grape</b>	( <i>Mahonia</i> species)
Portuguese and other exotic heaths	( <i>Erica</i> species)

## Vines

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<b>Bluebell creeper</b>	( <i>Sollya heterophylla</i> )
<b>Blue Periwinkle</b>	( <i>Vinca major</i> )
<b>English ivy</b>	( <i>Hedera helix</i> )
<b>Japanese honeysuckle</b>	( <i>Lonicera japonica</i> )

## Herbaceous Plants

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Alstroemeria	( <i>Alstroemeria aurea</i> )
Californian poppy	( <i>Eschscholzia californica</i> )
Creeping buttercup	( <i>Ranunculus repens</i> )
Foxglove	( <i>Digitalis purpurea</i> )
Freesia	( <i>Freesia alba X leichtlinii</i> )
Gazania	( <i>Gazania</i> species)
Stonecrop and similar succulents	( <i>Crassula, Aloe, Sedum</i> species)
Soapwort	( <i>Saponaria officinalis</i> )
Tritonia	( <i>Tritonia lineata</i> )
Wood-sorrel, Oxalis	( <i>Oxalis</i> species)

## Grasses

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Treat any ornamental grasses with suspicion. If you want to use grasses in landscaping try to find attractive locally native species such as native sorghum (*Sorghum leiocladum*), barbed-wire grass (*Cymbopogon refractus*), kangaroo grass (*Themeda triandra*), red-anther wallaby grass (*Joycea pallida*) or some of the snow-grasses (*Poa* species) or spear grasses (*Austrostipa* species).

Swamp foxtail (*Pennisetum alopecuroides*) is a native species which is sold as an ornamental. However, it can be confused with fountain grass (*P. setaceum*), an exotic with much fluffier mauve seed-heads which tend to be curved. Swamp foxtail heads are more red-purple and straight. Ask to see a flowering plant before you buy.

## For more information

### Books and leaflets:

*Bush Invaders of South-East Australia.* Adam Muyt – RG & FJ Richardson, 2001

*Environmental Weeds, A field guide for SE Australia.*

Kate Blood – CH Jerram, 2001

*Noxious Weeds of Australia.* WT Parsons & EG Cuthbertson – Inkata Press, 1992

*Plants of Western New South Wales.*

G.M. Cunningham, W.E. Mulham, P.L. Milthorpe and J.H. Leigh, 1992

*Noxious and Environmental Weed Control Handbook – 3rd Edition.*

*Weed Control in Lucerne and Pastures 2006/2007.* NSW Agriculture, 2001

*Willow Identification for River Management in Australia.*

KW Cremer. CSIRO, Technical Paper No 3, 1995

*Grassland Flora, a field guide for the Southern Tablelands (NSW & ACT).*

David Eddy, Dave Mallinson, Rainer Rehwinkel & Sarah Sharp, 1998

*Native Grasses, an identification handbook for temperate Australia.*

Meredith Mitchell – Landlink Press, 2002

### Websites:

[www.esc.nsw.gov.au/weeds](http://www.esc.nsw.gov.au/weeds) for coastal and some Monaro weed photos and information, and links to numerous other weed websites.

[www.murrumbidgee.cma.nsw.gov.au/uploads/media/Regional\\_Weed\\_Strategy.pdf](http://www.murrumbidgee.cma.nsw.gov.au/uploads/media/Regional_Weed_Strategy.pdf)

[www.agric.nsw.gov.au/weeds/](http://www.agric.nsw.gov.au/weeds/)

[www.murrumbidgee.cma.nsw.gov.au](http://www.murrumbidgee.cma.nsw.gov.au)

[www.lmd.cma.nsw.gov.au](http://www.lmd.cma.nsw.gov.au)

[www.murray.cma.nsw.gov.au](http://www.murray.cma.nsw.gov.au)

[www.nswweedsoc.org.au](http://www.nswweedsoc.org.au)

[www.ento.csiro.au/research/weedmgmt/weedmgmt.html](http://www.ento.csiro.au/research/weedmgmt/weedmgmt.html) provides information on biological control of weeds.

[www.dpi.vic.gov.au](http://www.dpi.vic.gov.au) and [www.dse.vic.gov.au](http://www.dse.vic.gov.au) and follow the links to plants and animals, hence to pest plants. Landcare Notes series of weed profiles available on line.

[www.weeds.org.au/index.html](http://www.weeds.org.au/index.html) provides an excellent search facility to source information about specific weeds, including identification features.

A search on a search engine such as Google using the scientific name in quotation marks (thus: "Cytisus scoparius") will produce a wealth of information (and often photographs) about individual weeds and suitable control methods. The USA has many informative websites. However, be aware that herbicides are marketed under different trade names in different countries and a familiar trade name may refer to a different chemical than it does in Australia.



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