



# primefacts

FOR PROFITABLE, ADAPTIVE AND SUSTAINABLE PRIMARY INDUSTRIES

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## Privet – broad-leaf, small-leaf and European

### Invasive Species Unit

#### Introduction

Three species of privet are noxious weeds in NSW: *Ligustrum lucidum* (broad-leaf or tree privet); *Ligustrum sinense* (small-leaf, narrow-leaf or Chinese privet); and *Ligustrum vulgare* (European or common privet). Broad-leaf privet and small-leaf privet originate from eastern Asia and have become widespread weeds of disturbed land, pastoral areas and native bushland in coastal NSW. European privet is native to southern Europe and northern Africa and is problematic west of the dividing range in NSW. All three species were introduced to

Australia as ornamental or hedging species, and now have extensive environmental, agricultural and human health impacts. Unfortunately privets are still present in urban gardens, public plantings, hedges and windbreaks, although it is thought that new plantings of privet have declined.

#### Distribution

Broad-leaf and small-leaf privets occur as widespread weeds in coastal and tableland areas of New South Wales. Within the Sydney area, small-leaf privet is the more widespread species.

European privet generally occurs at higher altitudes west of the dividing range on the NSW Northern,



Figure 1. Small-leaf privet invading a creek line. Photo: Birgitte Verbeek

Central and Southern Tablelands and the North-West Slopes. It has become naturalised in the Yetman area, in the Guyra–Armidale district near Robertson and in the vicinity of the Yarrongobilly Caves.

Privets are able to invade a range of natural ecosystems as well as forestry, horticultural crops and pastures. Most native plant communities in moist and fertile areas within current privet distributions are at risk of invasion. Privet infestations are frequently found in areas that receive increased water and nutrients from urban runoff, particularly where native vegetation has been disturbed or removed.

### **Habitat**

Broad-leaf and small-leaf privets prefer warm, humid environments with moderate to high soil moisture throughout the year. Creeks, gullies and drainage lines are favoured by both species, but seedlings are able to establish in drier areas if runoff water is temporarily available. Both species occur in areas with rainfall between 700–1600 mm.

European privet also prefers moist areas, and while seedlings can spread to drier areas, they tend not to form mature stands.

Both broad and small-leaf privet seedlings can tolerate very low light levels, allowing them to persist beneath dense canopies of vegetation. European privet will generally only establish in high light conditions, but once mature, plants can persist beneath canopy shade.

All three privets have been found growing in a range of soil types, from pure sands through to friable loams, and almost pure clays. However, it is generally agreed that privets thrive on more fertile shale or clay-derived soils found in riparian areas.

### **Impact**

#### **Natural ecosystems**

All three privets are considered to be serious environmental weeds throughout Australia. Infestations threaten biodiversity, including endangered plant and animal species and ecological communities. Dense stands of privet prevent other vegetation surviving or establishing.

Broad-leaf privet invades ecosystems including subtropical and coastal rainforests, rainforest margins, warm-temperate and dry rainforest, wet and dry eucalypt forests, grassy woodlands, grasslands and riparian vegetation. Small-leaf privet

invades wet and dry eucalypt forests, woodlands, riparian vegetation and subtropical rainforest margins. European privet invades grassy woodlands and riparian vegetation.

### **Human health**

It is reported that privet pollen causes allergic reactions and hay fever. It is unlikely that the pollen of privet is strongly allergenic; however, cross-reactivity can occur where people who are sensitive to grass pollen can become sensitive to privet, producing allergic reactions. It is thought that the perfume of privet flowers causes these reactions, not the pollen. Reactions occur commonly during spring and early summer when privets produce masses of flowers and pollen. These include allergy-like symptoms such as asthma and irritation of mucous membranes. In one extreme case, hospitalisation resulting in near death occurred after the patient was exposed to privet.

Privet berries and leaves have been reported by overseas sources to be poisonous to humans and livestock if ingested; however, no known cases of poisoning have occurred in Australia.

### **Primary production**

Privets invade native and plantation forest industries, orchards and pastures in Australia. Costs of control are high and yields are reduced by the presence of privet in these production systems.

### **Description**

Privets are members of the Oleaceae (olive) family.

#### **Broad-leaf privet**

Broad-leaf privet grows as an evergreen shrub or small tree to a height of 4–10 m. The brown bark is covered in small white lenticels (pores that allow gas exchange). Pointed oval-shaped leaves occur in opposite pairs, and are 4–13 cm long and 3–6 cm wide. The upper leaf surface is dark green and glossy or shiny while the under-surface is paler with distinct veins. Leaves are hairless. Cream or white tubular flowers with four petal-like lobes occur in branched clusters – each flower is 3.5–6.0 mm long. Flowers have a sickly sweet fragrance. Berries are 9 mm long and 12 mm in diameter, and are green when young, turning red through to blue to glossy or purplish black as they ripen. Berries usually contain two oval-shaped ribbed seeds 5 mm long. Roots are woody, branching, thickened at the crown and mostly shallow.



Figure 2. Broad-leaf privet. Photo: Elissa van Oosterhout



Figure 3. Broad-leaf privet leaves. Photo: Ann Loughran



Figure 4. Broad-leaf privet flowers. Photo: Elissa van Oosterhout



Figure 5. Broad-leaf privet berries. Photo: John Hosking

### Small-leaf privet

Small-leaf privet is a densely branched, multi-stemmed evergreen shrub 3–5 m tall (occasionally growing to 7 m). The smooth bark is brownish–grey on stems and greyish–green on branches. Young branches are covered in fine, short hairs and small branches have white lenticels. Oval-shaped leaves occur in opposite pairs and are 1–7 cm long and 0.5–3.5 cm wide. Leaf tips may be pointed or round. The under-surface of each leaf is covered in fine hairs (including the midribs) and both leaf surfaces are mid to dull green. Leaves often have distinctly wavy margins and are held at right angles to the stems. White, tubular, lobed flowers with mauve to purple anthers occur in branched clusters. Flower tubes are 0.5–2 mm long with 3.5 mm lobes, and are very strongly scented. Berries are 4–10 mm in diameter, green when young, ripening to dull purple or blue–black. Each berry contains 2 oblong seeds 3–4 mm long. Roots are woody, branching, thickened at the crown and mostly shallow. Small-leaf privet may be semi-deciduous in colder areas.



Figure 6. Small-leaf privet. Photo: Elissa van Oosterhout



Figure 7. Small-leaf privet leaves. Photo: Ann Loughran



Figure 8. Small-leaf privet flowers. Photo: Chris Evans, River to River CWMA, Bugwood.org



Figure 9. Small-leaf privet berries. Photo: J. Miller, USDA Forest Service, Bugwood.org

## European privet

European privet is a deciduous or semi-deciduous multi-stemmed shrub or small tree growing 3–5 m. Stems are erect, with smooth grey–brown bark. Young branchlets are covered in fine hairs. Older branchlets have white lenticels. Narrow, hairless leaves are 2–6 cm long and 0.8–2.5 cm wide, occurring in opposite pairs. Leaf tips are pointed while the leaf base is wedge-shaped. Upper and lower leaf surfaces are dark, shiny green. The white or cream tubular flowers are strongly scented, have white anthers and are 3–4 mm long. Berries are 3–10 mm long and 5–8 mm in diameter and are shiny black to blue–black when ripe. Some varieties of this species are known to have green, white or yellow berries when ripe. Each berry usually contains 2 long flat seeds 4–5 mm long (there can be up to 4 seeds per berry).



Figure 10. European privet. Photo: Nava Tabak, Invasive Plant Atlas of New England, Bugwood.org



Figure 11. European privet leaves. Photo: James Browning



Figure 12. European privet flowers. Photo: Nava Tabak, *Invasive Plant Atlas of New England*, Bugwood.org



Figure 13. European privet berries. Photo: James Browning



Figure 14. All privets have characteristic pore-like lenticels. Photo: Birgitte Verbeek

### Differentiation of species

The three privet species can be differentiated by the following features:

Privet species	Distinguishing features
Broad-leaf privet	Leaves generally 50–130 mm long; flower tube shorter or as long as the lobes; anthers well extended from the tubes; fruits bluish-black, on short stalks.
Small-leaf privet	Lower leaf midribs finely hairy, leaf margins smooth to wavy; flower tube shorter than lobes; anthers mauve to purple, fruits blackish-purple, on hairy stalks.
European privet	Lower leaf midribs not finely hairy; leaf margins never wavy; flower tube slightly longer than lobes; anthers white and barely extended from the tubes; fruits glossy black, on short, slightly hairy stalks.

### Similar looking species

Broad-leaf privet is commonly confused with the native shrub sweet pittosporum (*Pittosporum undulatum*). Other native tree species that can be confused with privets include coachwood (*Ceratopetalum apetalum*), lilly pilly (*Acmena smithii* and *Syzygium* spp.), cheese tree (*Glochidion ferdinandi*), grey myrtle (*Backhousia myrtifolia*), native mulberry (*Hedycarya angustifolia*), mock olives (*Notelaea* spp.) and sweet morinda (*Morinda jasminoides*). Care is needed to distinguish privets from these native species (see 'Publications available' below).

### Life cycle

Privets reproduce primarily by seed. Mature plants can produce up to ten million seeds each growing season. Broad-leaf privet seeds can survive 1–2.5 years in the soil, while small-leaf privet seeds are thought to survive only 6 months in the soil. Masses of seedlings will germinate in ideal conditions, surviving in low light levels until disturbances to the shade canopy stimulate growth. Seedlings can remain in a juvenile state for up to four years.

Privets are estimated to live for 50–100 years. Suckering around the base of old plants makes them potentially far longer lived.

## Germination

Small-leaf privet germinates in temperatures ranging from 15° to 25°C, while broad-leaf privet prefers temperatures near 15°C and has very poor germination above 20°C and below 10°C. European privet will germinate after extended exposure to cold and damp conditions (0°–2°C).

Seeds require shallow burial in the soil (to 1 cm) in order to germinate (they do not germinate on top of the soil). Fresh seeds that have passed through the guts of birds or other animals can germinate immediately.

## Growth of seedlings

Privet seedlings growing in dense shade can survive long periods of unfavourable conditions such as low light and water shortage. Growth under these conditions is restricted, but faster than that of the surrounding vegetation, particularly in low light. These young privets can also outnumber native species by ratios of several hundred to one and when growth accelerates with any increase in light (due to activities such as weeding or clearing), the young privets rapidly become dominant.

## Flowering and fruiting

Privets appear to have a long juvenile period before reaching reproductive maturity (four years for broad-leaf privet). Privets flower in spring and the fruit ripens in autumn and winter. Small-leaf privet flowers earlier and can also achieve a low level of flowering and fruiting throughout the year.

## Vegetative reproduction

Vegetative reproduction commonly occurs in small-leaf privet, but less commonly in the other two species. Small-leaf privet produces root suckers and sprouts, and, it has been suggested, rhizomes. Broad-leaf privet can sucker, but generally only from damaged stems and roots or cut stumps. There is some evidence that European privet can also sucker.

## Spread

Privet seeds are commonly spread by fruit-eating birds. Birds such as pied currawongs, silver-eyes and rosellas can spread the seed widely into previously uninfested areas. Privet seedlings often germinate in clusters, as a result of birds regurgitating the seeds. Birds and rabbits assist germination by removal of the soft coating around the seed.

Privets are also spread through the sale of garden plants from nurseries and markets, the dumping of garden waste containing seeds and the sale of foliage in floral arrangements containing fruit and seeds. Seeds can also be spread in flowing water.

## Control and management

The following are guiding principles for privet control and management.

- Locate, map and monitor the extent of an infestation and any changes in weediness, as well as any cultivated plants in the locality of the infestation.
- Identify key sites, assets or industries at risk from the infestation (natural ecosystems, human health, primary production, etc.).
- Control infestations in close proximity to the identified key sites/assets/industries, aiming to reduce weed density.
- Prevent spread from cultivated plants in the locality.
- Continue to control growth and spread of the infestation.

## Controlling spread

Wide dispersal of seed by birds cannot be controlled; therefore controlling the spread of privet requires the removal of seed trees and young seedlings before they produce seed.

## Follow up control and revegetation

Many attempts to control or remove privet have failed because of its ability to regenerate vigorously from root and stem suckers. Follow-up control measures are critical for successful removal. The removal of large numbers of privet bushes from other vegetation can cause enough disturbance that reinfestation occurs. Revegetation with appropriate species, along with ongoing weed control, can assist with preventing reinfestation. Where privet is providing a replacement habitat and food source for fruit-eating birds, control efforts must ensure that removal is undertaken gradually in combination with revegetation with suitable species.

## Manual removal

Manual removal techniques such as the original 'Bradley method' allow for good control of privet with minimal disturbance to the surrounding vegetation. These techniques involve hand-weeding of small and medium-sized privet plants, where the gaps left by weeding must be similar to those that occur naturally after the death of a native plant. Soil disturbance should also be minimised.

Broad-leaf privet is easy to pull up when it has a stem diameter of less than 2–3 cm, particularly after rain. Similar sized small-leaf privet is more difficult to remove as the stems are more likely to break from the root system when pulled, leaving viable root segments capable of regeneration. Small-leaf privets should be dug out and the plants placed upside-down to dry out the roots.

## Control with herbicides

There are a number of herbicides registered for privet control, each with specific methods of application. Refer to the *Noxious & Environmental Weed Control Handbook 4th Edition* for a list of registered herbicides and their application methods for privet control (see 'Publications available' below).

Foliar treatments can be made to flushes of seedlings and groups of plants up to 3 m high. Plants must be actively growing, not under heat or moisture stress, and complete coverage of the foliage is necessary to ensure successful control. Foliar treatments are appropriate where infestations contain dense stands of privet and little or no other valuable vegetation.

Basal bark applications are appropriate for treating larger individual plants in amongst other vegetation. Every trunk or stem arising from the ground must be treated.

Stem injection is also appropriate for treating larger individual plants in amongst other vegetation. Stem injection has been found to be the most cost-effective method of control in terms of volume of herbicide and labour costs. It is also most effective in terms of reducing off-target herbicide damage to other vegetation.

Where it is possible or desirable to completely remove whole plants, herbicide treatment of the cut stumps must be carried out in order to prevent regrowth from stumps. Cut-stump application of herbicides is very effective for controlling young plants, suckers or regrowth.

## Mechanical removal

Earth-moving machinery may be suitable for removal of dense stands of privet if high levels of soil disturbance can be tolerated. Large areas of seedlings or regrowth can be slashed. These methods will reduce the seeding capacity of a large infestation, but will not eradicate it. Follow-up with herbicide control or manual removal may provide higher levels of control. These areas should also be revegetated with trees, shrubs, ground covers or pastures and repeatedly hand-weeded or slashed thereafter. Mechanical removal is not recommended in steep areas or near water courses.

## Fire

Burning is generally ineffective against privet. Privet thickets are of low flammability and bushfires do not readily move through privet-dominated vegetation. Even when fire is very intense, privets are able to regenerate rapidly by sprouting or suckering. There is evidence to suggest that both broad and small-leaf privets can recover after high intensity fires

have killed the above-ground plant material (flowering has reoccurred within 3 years). Fire has been used as an initial control measure, followed up by treatment of regrowth with cut stump herbicide applications the following year. Persistent annual cool burns have been shown to eliminate small-leaf and European privet in southern USA, and it is thought that frequent fires probably assist with controlling seedling establishment of privet in infested eucalypt forests and woodlands in Australia.

## Biological control

There are no introduced biological control agents available for privet control in Australia.

## Reducing nutrient levels

Increased nutrient levels often contribute to the presence of privet infestations. Reducing or stopping the movement of nutrients in water from residential or industrial areas into riparian areas may help prevent establishment of large privet infestations.

## Legislation

Broad-leaf and small-leaf privets are Class 4 noxious weeds in a number of local government areas. European privet is a Class 4 noxious weed in four local government areas on the Northern tablelands.

Class 4 noxious weeds are plants that pose a threat to primary production, the environment or human health, are widely distributed in the area to which the order applies and are likely to spread in the area or to another area.

The control measures for Class 4 noxious weeds are that the growth and spread of the species must be controlled according to the measures specified in a management plan published by the local control authority and the plant may not be sold, propagated or knowingly distributed.

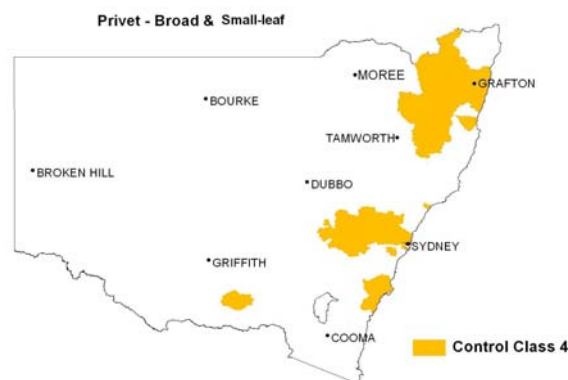


Figure 15. NSW declaration of privet – broad-leaf and small-leaf.



Figure 16. NSW declaration of privet – European.

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## Publications available

Ensbey, R. (2009), *Noxious and Environmental Weed Control Handbook, 4th Edition*, Industry and Investment NSW, Orange. Copies are available from the Industry & Investment NSW Bookshop, Orange. Phone 1800 028 374 or online at [www.dpi.nsw.gov.au/weeds](http://www.dpi.nsw.gov.au/weeds)

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