



Privet (*Ligustrum sinense*)

Plant properties, control strategies and methods for control

Introduction:

The privets that occur in this local area are large-leaved and small-leaved privet and both originate in China and Japan.

Both species have spread to a large range of habitats and dominate moist gullies and stream banks, as well as fence lines. Small-leaved privet is more invasive than the large-leaved species.

Both privets were ranked 9th and 10th, respectively in the North Coast Environmental Weeds Risk Assessment undertaken by the North Coast Weeds Advisory Council. Small-leaved privet was the most common weed on the North Coast of NSW.

This leaflet will deal with small-leaved privet (*Ligustrum sinense*), while many recommendations are also applicable to the large-leaved species.

Description:

Small-leaved privet is a large shrub or small tree to 5 m high. It was introduced to the NSW North Coast for use as hedge plants and windbreaks. On the Dorrigo plateau it was appreciated for frost resistance.

The leaves are oval-shaped, soft, not strong smelling when crushed and are opposite to each other along the stem. Small-leaf privet green glossy leaves up to 7 cm long, usually with wavy margins.

Privet flowers are small and white in large sprays on the ends of or along the branches. Small-leaf privet produces very large numbers of black berries about 4 to 6 mm across. The bark on large specimens is smooth with numerous lenticels (raised corky pores).

Growth cycle:

Germination: Privet will not germinate until the seed has been removed from the fruit. When this occurs, small-leaf privet germinates readily. The hard seedcoat of broadleaf privet can delay germination if it is not removed. Almost 100 % of privet seed is viable.

Small-leaf privet germinates well in a range of temperatures from 15° to 25°C. S

The seed remains viable both inside and outside of the fruit for up to two years and all control sites must be re-visited for that period of time.

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 its competitors, particularly under low light. These young privets may also outnumber native species by ratios of several hundred to one and when growth accelerates with any increase in light, caused by activities such as weeding or clearing, the abundant young privets generally have no difficulty competing with and eliminating native species.



Flowering and fruiting:

Privet flowers in spring and the fruit ripens in late autumn and winter. Small-leaf privet flowers earlier than broadleaf privet but its fruit can stay on the plant later.

As many as 3000 fruits per small stem are set and can amount to over 1 million seeds per mature tree in open areas in a favourable year.

Dispersal:

Privet berries are eaten by birds including currawongs, silver-eyes and eastern rosellas which spread the seed widely (up to 1 km distance).

Also dispersed by water.

Privet seedlings often germinate in clusters, the result of birds regurgitating the seeds. Birds also assist germination by removal of the soft coating around the seed.

Reasons for control

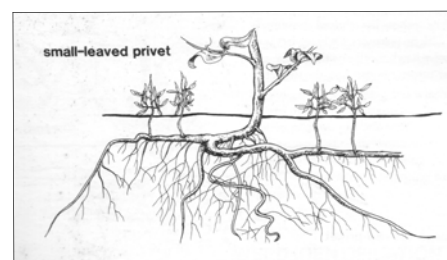
1. Habitat values

Privet is very competitive in disturbed areas, on edges of native vegetation and along waterways and it prevents desirable native species from surviving and/or establishing themselves.

It creates extensive shade and collects soil moisture and nutrients through a dense root system.

It favours those birds that feed on the berries, some of which (Currawongs for instance) are aggressive towards other native birds.

Privet can create its own monoculture and exclude other plants.



2. Streambank erosion

Privet has a relatively shallow root system and therefore is not a good stabiliser of riparian soil. By excluding other more suitable species, it contributes to streambank erosion.

3. Water quality

While trials have shown that aquatic organisms can break down privet foliage, there is anecdotal evidence that the seed fall contributes large amounts of nutrients to the aquatic system within short time periods and depletes water quality.

4. Public health

Large amounts of pollen are produced in early spring and summer and cause allergic reactions, such as hayfever and asthma in some people.

5. Degradation of pastures

Privet spreads onto adjoining pastures, reducing the feed value of the paddock.

Control Methods

1. Non-chemical

- * Small seedlings higher than 40 cm can be hand-pulled.
- * Large stems (diameter of a human wrist) can be treated by hammering the bark off for a 10 cm wide strip around the stem, below the first branch. This method causes a slow death of the tree with a gradual loss of foliage and is advantageous where native seedlings are present to take advantage of the increased light conditions. Follow up control will be necessary where the bark re-grows over the wound.



Rings of bark hammered off Camphor laurel stems

- * Large areas of privet can be knocked down with an excavator-mounted mulcher. This facilitates access to the site, a selective approach to save native trees that are present and it prepares the site for follow-up chemical control. On riverbanks however, the last row of privet trees along the bank will have to be removed by other means, as the mulching contributes too much debris to the stream.
- Large infestations can be bulldozed where soil disturbance is not a problem. However, the germination of seeds in or on the ground will require follow-up control.



Excavator-mounted mulcher trial at North Dorrigo, mulched privet stumps in foreground

2. Chemical

* **Foliar spray** is appropriate where it can be applied to all or most of the foliage. This is often the case where there is a carpet of seedlings or in young and reasonably low infestations.

A number of chemicals are registered for this use and include those with the active ingredient Metsulfuron methyl, which is recommended due to its low toxicity and specificity for dicotyledons (plants with two seed leaves) and not effecting grasses (monocotyledons).

Check the labels and add wetting agent.

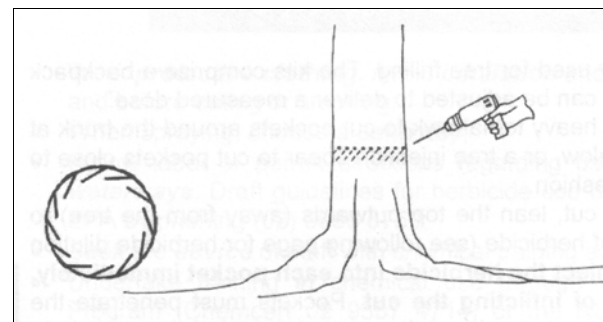
* **Cut and paint** is effective for stems to 10 cm diameter. It involves cutting the stem below the first branch and painting on herbicide within 20 seconds of cutting. Herbicide with the active ingredient glyphosate is recommended at a rate of 50 to 100%. Care must be taken to keep the herbicide in the jar free of wood shavings to maintain effectiveness and avoid breakdown of the herbicide prior to application.

* **Stem injection and stem frilling**

Herbicide is applied to cuts or holes made into the trees. Two rows of holes or cuts around the tree at intervals of 100 mm should be made. These rows should be below the lowest branch and must be applied to every stem. Herbicide must be applied within seconds of drilling/frilling. Applicators include stem-injecting kits, squeeze bottles, syringes. They must have small tips to match the cut or hole in the tree.

Drilling: Use 10 mm drill bit, drill at downward angle to create a reservoir and to avoid herbicide running out of the hole.

Frilling: Use light sharp hatchet or short-handled axe. Cut at angles parallel to ground level.





Frilling into the sapwood, but parallel to ground level to avoid herbicide running out of cut.

Herbicides suitable for stem-injection include those with an active ingredient of Glyphosate at 360 g/l or 450 g/l. These are available under a large number of tradenames. Rate: For best results use undiluted.

The advantage of this method is that the plant material must not be taken away, which saves a lot of time. Dead privet trees will break down on site over relatively short time periods.

Herbicides with the active ingredient triclopyr and picloram are also registered for stem injection. Check with your herbicide supplier.

*** Basal Bark application**

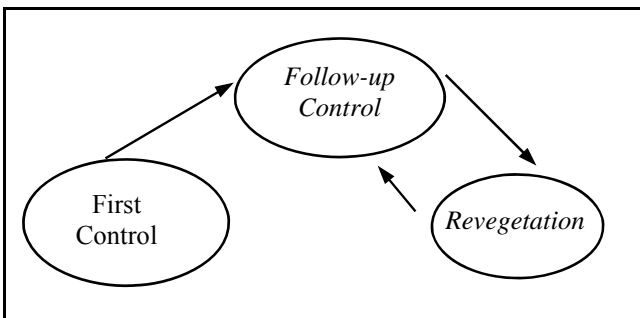
This method is suitable for stems smaller than 10 cm diameter and registered herbicides include Garlon® and Access® mixed with diesel. The mixture is sprayed or painted onto the whole stem from the ground to 300 mm height.

Strategies

The North Coast Weeds Advisory Council has developed a weed management strategy for the North Coast which involves many stakeholders such as the Catchment Management Authority, local Councils, private landholders and landcare groups (www.northcoastweeds.org.au).

Private landholders develop strategies for their properties, identifying priority areas according to the value of the vegetation they want to protect (high value first), and the level of infestation (low level first), available funds and capabilities.

Any control strategy should include plans for initial control, follow up control and revegetation.



Examples of typical situations and possible plans for control:

1. *Heavy privet infestation on stream bank, up to 20 m wide, 1 km long, few native trees present.*

- Start at the upstream end of the site, assess what length of bank can fit into the annual work plan for the property.
- Coordinate excavator-mounted mulcher with other sites to share cost of machinery transport.
- Mulch the first length of the site to the last row of trees along the edge of the stream.
- Frill or drill and inject row of trees on water's edge.
- Allow time for significant re-growth of foliage.
- Spray re-growth with selective herbicide.
- Revegetation program can begin using *lomandra hystrix* for initial soil stabilisation close to water's edge, as well as pasture species where desired.
- Follow-up spray one year later.
- Revegetate.
- Repeat program to the length of stream bank, as annual work plan allows.

2. *Privet infestation on edge and in gaps of remnant, on streambank, in gully or similar*

a. Non-chemical:

- Hammer the bark as described above and hand pull all seedlings around native seedling present. Leave other privet seedlings to competitive processes until later. Monitor these and pull them out when they exceed 40 cm in height.
- Check all hammered trees every four to six months for bark re-growth and treat again if necessary.

b. Chemical:

- Cut and paint, remove all cut material, or
- Frill or drill and inject, leave trees standing.
- Check on follow-up visits for any live branches, re-treat if necessary.

Depending on the size of the gap within the remnant, planting may be advantageous to speed the closure of the gap. Also, planting the edge of the remnant with bushy species to reduce light penetration into the remnant will reduce the re-infestation with privet.

3. *Privet hedge along fence lines*

- Foliar spray with selective herbicide while plants are actively growing.
- Check after one year for any re-growth and re-treat if necessary.
- Check for other weed species within the privet, such as Camphor laurel, that may require other methods for control.

The legal situation

Native vegetation is protected under the Native Vegetation Act 2003, which identifies which vegetation can be removed where and what permission is required.

The control of privet is not regulated under this Act, except where it grows on State Protected Land, because it is a non-native plant.

State Protected Land is all land adjacent to prescribed streams to the width of 20 m from the top of the bank, as well as land that is mapped steeper than 18°.

Guidelines for the removal of exotic vegetation from protected land are currently being developed. Until they are approved, the *old* Act applies to privet removal on protected land and consent *is* required from the Department of Natural Resources.

The Threatened Species Conservation Act specifies the length of vegetation gap allowed (50 m) where a threatened species is present, such as a species of bird. Bellingen Shire Council allows the removal of exotic vegetation from streams without approval, provided no soil disturbance takes place.

Case Studies

1. Dorrigo Golf Club

The golf club manages 38 acres of land on the Bielsdown River near the Dorrigo township. The land is a public reserve and was developed as a golf course more than 50 years ago with grassed slopes to the Bielsdown River. A photo in the club house, dated 1972, shows the riverbank free of privet. The banks have become overgrown with privet since then.

When Warren Atkins took up the position as greenkeeper in the Olympic year 2000 he began to control privet using the cut & paint method. He worked on the privet mostly during the winter months, when there was not so much mowing to be done.

Warren has now cleared all but 500 m of the 2 km privet-infested river frontage and made the river once again the asset that it is to the scenery of the club grounds. He is revegetating carefully, using mostly local tea-tree (*Leptospermum polygalifolia*), keeping in mind the constraints of cold winters, his own workload and the need of a golf course for sunlight and grassy groundcover.



Bielsdown River, Dorrigo Golf Club

2. Little Plain Creek, North Dorrigo

Little Plain Creek is heavily infested with privet along most of its length and there are few native trees present, mainly *Acacia melanoxylon*. The country here is farmed for beef, dairy and potato production.

The North Dorrigo Recreation Ground is a public reserve, managed by the Dorrigo Pony Club for Bellingen Shire Council. The club uses the paddocks along the creek for beef production to boost their club funds.

The North Dorrigo Water Users Group has a water scheme set up that pumps from Little Plain Creek and supplies a number of houses in the village with water.

This site was used for the demonstration of the excavator-mounted mulcher in March 2005 after much difficulty with gaining the necessary permit for clearing of vegetation on protected land.

The mulcher worked to the edge of the water in one spot and it was decided that the amount of debris strewn into the water was unacceptable. The work then continued to the last row of privet trees on the edge of the stream, which were frilled and injected by hand.



North Dorrigo Recreation Ground, January 2006

The mulched privet was sprayed within a fortnight with a mixture of brush-off® (10g/100ltr) and roundup® (100 ml/100ltr) to treat the carpet of privet seedlings and inhibit re-growth of mulched stems. (Glyphosate is added at this rate to prepare a weed free area for the planting of lomandra.)

The site will be planted with *Lomandra hystrix*, and sprayed again before the end of the growing season in 2006.

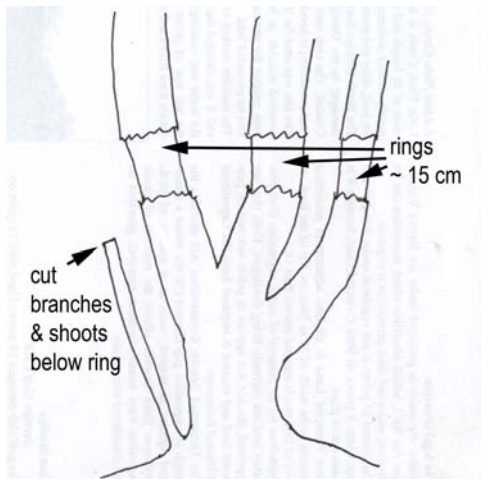
To achieve best results in these situations, where privet has a large root system and little foliage due to the mulching, it is best to wait with the follow-up spraying until the plants have re-grown to at least 1/2 metre in height.

Where revegetation with trees and shrubs is not intended until the following year, the glyphosate component can be reduced to 10 ml/100 l. Revegetation with trees and shrubs will begin at this site in March 2007.

3. Lizardland, North Bank Road, Bellingen

As part of a general bush regeneration program, small-leaved privet removal has been done without herbicide at this property on North Bank Road for 10 years. The privets occurred as a continuous canopy along gullies formerly cleared of Flooded Gum forest and rainforest for grazing. On the ground beneath the mature privets there was a dense carpet of privet seedlings up to 40cm tall, and occasional rough ground ferns (*Hypolepis muelleri*) and native tree seedlings - mainly Scentless Rosewood and Plum Myrtle. Other common weeds were lantana and broad-leaved paspalum. In the course of removing the privet, lantana and broad-leaved paspalum and regenerating native vegetation a simple trial was conducted on a small sample of 19 privets in order to assess the ringbarking method.

All privets greater than wrist thickness were ringbarked between 30cm and 150cm above the ground as was most convenient for access. Ringbarking was done with a hammer and removed only the bark down to the sapwood. The sapwood was not damaged. Multi-stemmed privets were ringbarked on each stem, or if space allowed, below the branching. Any small branches or shoots coming from below the ring were cut off. No attention was paid to time of year, although the bark was slightly more difficult to remove in winter.



Results were as follows:

Response	Follow-up 1	Follow-up 2	Follow-up 3
Re-shoot	16 (84 %)	9 (47 %)	1 (5%)
Sucker	7 (37%)	2 (10%)	0
Heal	13 (68%)	1 (5%)	0
Total treated	19 (100%)	16 (84%)	1 (5%)

The first follow-ups were done between 5 and 8 months after treatment. Subsequent follow-ups were done as time allowed over 2 years. The three responses to the treatment were *re-shooting* from below the ring, *suckering* from roots, and *healing* over of the ring. Initially 5 trees (26%) exhibited all three responses, 7 (37%) exhibited 2 of the responses and 7 (37%) exhibited only one of responses. The trees were re-treated as needed by removing shoots and/or suckers (with hammer or loppers) or either re-wounding rings or making new rings (as convenient). No tree required more than 3 follow-ups, before it died.

As treatment of the sample and other non-trial privets proceeded (always in conjunction with removal and follow-up on the other weeds on the sites), the privet carpet was treated as follows: Only seedlings greater than 50cm were removed (by hand pulling). The bulk of the carpet was left for observation. As the canopy privets slowly lost foliage cover, there was a vigorous response of the rough ground ferns, particularly in the moister sites. In some cases these completely dominated the ground cover after one year. Seedling native trees also responded vigorously, as did any larger native trees and vines. As a result almost the entire privet carpet of seedlings failed to survive, so very little treatment of the ground was required, other than hand pulling of any that reached 50cm. Drier sites required more hand pulling.



Dead privets 3 years after treatment and a dense native regeneration beneath.

This case study and illustrations were contributed by Ross Macleay.

References:
 Buchanan, R. 1989 - *Bush Regeneration: recovering Australian landscapes*, TAFE NSW
 Ensby, R. 2004 - *Noxious and Environmental Weed Control Handbook*, NSW Agriculture
 Mowatt, J. & Smith, Dr L, 1998 - *Privet, Agfact P7.6.8*