

Lantana

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Introduction

Lantana (*Lantana camara*) and creeping lantana (*Lantana montevidensis*) are shrubs that have been grown as ornamentals and are now major weeds in coastal and sub-coastal areas. Lantana is one of Australia's most debilitating invasive weeds. It is recognised as a Weed of National Significance (WoNS) because of its impacts on primary industries, conservation and biodiversity, and the extent of its distribution.

Lantana is a heavily-branched, scrambling, thicket-forming shrub, usually ranging from 2–4 m in height.

Creeping lantana is a scrambling, low, woody shrub which often grows over rocks and along tree branches.

Lantana and creeping lantana are natives of the tropical and sub-tropical regions of Central and South America. Lantana was first introduced into Australia as an ornamental plant. Its first recording in Australia was in 1841 and by the 1860s, it was naturalised in the Sydney and Brisbane areas. This once-innocent garden plant has since escaped and thrived under the favourable tropical, sub-tropical and temperate conditions of eastern Australia.

Description

Lantana

Lantana is a perennial, summer-growing, erect or scrambling shrub, growing up to four metres high and often forming dense thickets. Flesh of the plant produces a strong, aromatic odour when crushed. The plant is a member of the *Verbenaceae* (verbena) family. Lantana is characterised by square-shaped stems with short, curved and hooked prickles.

Leaves

Leaves are opposite and curved on a short stalk and are about 10 mm long. They are egg-shaped (ovate) to spearhead-shaped (lanceolate), with toothed edges; rough and bright green on the upper surface and hairy and pale green below; 2–10 cm long and 2–8 cm wide.

Flowers

Flowers form in dense clusters and vary in colour from red–yellow (Figure 1), orange–pink, and white; depending on the type, maturity and location. Flowering and fruit production can occur almost year round in suitable areas where there is adequate soil moisture, high air humidity and high temperatures.

Fruit

The fruit is a succulent, one-seeded drupe or berry about 6–8 mm in diameter. These develop in clusters and consist of aggregate, fleshy segments that are green at first and then turn a shiny, dark purple–black when ripe (Figure 2).



Figure 1. The red-flowered lantana is very toxic.
Photo: D. Stock, QDPI&F.



Figure 2. Leaves, buds, flowers, green and mature berries of a pink edged red flowered *Lantana camara*. Photo: A. Johnson

Varieties

Lantana is a highly variable species with at least 29 varieties reportedly present as wild and cultivated species in Australia. There are five main types identified by flower colour: pink, red, orange, white and pink-edged red. The most common lantana varieties in New South Wales (NSW) are common pink, common pink-edged red, round red and Stafford red. These are all classified as different varieties because of their colour and flower shape.

The common pink-edged red lantana variety is found on the North Coast, around Kempsey, south-east of Dorrigo, Bellingen, in the Coffs Harbour and Grafton areas, and on the Central Coast. Tests have shown leaves and stems to be very toxic if eaten.



Figure 3. Pink flowered lantana. Photo: A. Johnson

The round red and Stafford red (red varieties) are found on the North Coast, around Kempsey, Bellingen and Coffs Harbour. Tests have shown both of these varieties to be toxic.

The red varieties sometimes have a different growth habit to the pink varieties, being a more compact bush with pricklier stems and darker green leaves.



Figure 4. Purple flowered creeping lantana (*Lantana montevidensis*). Photo: S. Johnson

Creeping lantana

Creeping lantana (*L. montevidensis*) is a scrambling low woody shrub which has short, profusely flowering branches that form mats. The flowers are purple (Figure 4) or lilac with white or yellow centres (Figure 5). The fruit is similar to lantana.

Creeping lantana has stems that are square in cross section similar to lantana but without prickles. The leaves are also similar to lantana but only 2–3 cm long.



Figure 5. Yellow flowered creeping lantana (*L. montevidensis*). Photo: S. Johnson

Distribution

Lantana currently infests more than four million hectares of land across Australia, mainly in areas east of the Great Dividing Range in NSW and Queensland. Its current range extends from the Bega Shire in southern NSW to Cape Melville in north Queensland.

Lantana is also a weed in the Northern Territory, Western Australia and South Australia. It may have the potential to invade Victoria. It is also present in all States and Territories as an ornamental plant.

In NSW, lantana is widespread across coastal NSW and is also present on Lord Howe and Norfolk Islands. It is generally considered that lantana has now reached its potential range in NSW, but it continues to invade new habitats within its range and increase its density.

Creeping lantana is a widespread weed in Queensland. In NSW it is commonly planted as an ornamental. However, there are a few places in NSW where creeping lantana is considered weedy.

Habitat

Lantana grows in a variety of coastal and sub-coastal areas. Lantana thrives under warm, high rainfall climates. It is most prolific in areas receiving average annual rainfall of at least 900 mm. It generally favours coastal areas inland to the Great Dividing Range and grows up to altitudes of 1000 m. Lantana is frost sensitive and no growth occurs when temperatures are below 5°C.

Lantana prefers moist soil but can survive prolonged dry periods. It grows best in well-drained, fertile soils including rich organic soils, well-drained clay soils and volcanic soils. Lantana will tolerate poor soils and sand and will grow on stony hillsides as long as moisture is available. However, it does not tolerate heavy clay soils, waterlogging or salinity. Lantana will tolerate partial, but not complete shading.

Lantana is a major weed along roadsides, riparian zones (river banks), fence-lines, forestry (Figure 8), pastures and waste areas (Figure 7). It also invades open native woodlands and sub-tropical rainforest fringes and can grow in steep inaccessible areas, making it difficult to control.

Lantana readily invades disturbed or neglected areas and where native woodlands have been thinned or cleared for grazing. Lantana is less common in undisturbed native vegetation communities.

Impacts

Widespread lantana infestations regularly impact on agriculture, the environment, forestry management, recreation and transport. Lantana, however, does provide some minor benefits for native fauna.

Toxicity

All forms of lantana are thought to be toxic, with the red-flowered forms being the most dangerous to stock.

Lantana poisoning in cattle is quite common and causes major economic losses. Most cases of poisoning occur in animals newly introduced into areas where toxic forms of lantana are already growing. Older cattle that are used to grazing lantana-infested areas are not as susceptible. During droughts or when other feed is scarce, stock are also more likely to graze lantana.

Early symptoms of lantana poisoning include depression, loss of appetite, constipation and frequent urination, followed by 24–48 hours of jaundice. The eyes of poisoned animals can also become inflamed with a slight discharge. The muzzle may become inflamed, moist, and very sensitive, with a pink nose. Photosensitisation usually follows with death typically occurring 1–4 weeks after the appearance of symptoms.

This slow and painful death is due mainly to liver insufficiency, kidney failure and, in some animals, myocardial damage and internal paralysis.



Figure 6. Lantana is often a weed along roadsides and fence lines. Photo: R. Ensbey.



Figure 7. Pink lantana invading pasture land.
Photo: R. Holtkamp.

Pasture Productivity

Lantana greatly reduces pasture productivity. It will readily invade pastures, particularly when they are poorly managed. If left uncontrolled, it will spread and exclude useful native grasses and improved pastures. Lantana along roadsides, riparian zones and fence-lines also increases the loss of available pasture (Figure 6).

Forestry management

Lantana is a serious weed of commercial eucalypt and pine plantations (Figure 8). It competes with tree seedlings for light and nutrients and also interferes with plantation access and general management. If uncontrolled, it can establish and become a prolific understorey invader that reduces forestry production.

Environment

Lantana is a serious invader of disturbed ecosystems including national parks and reserves. The weed can form a dense understorey competing with native flora and limiting natural regeneration. Increases in lantana composition can also increase the fuel load for fires.

Recreation and transport

Lantana can restrict access in bushland and riverbanks and also reduce the overall visual amenity



Figure 8. Lantana invading a coastal eucalypt plantation.
Photo: A. Clark, QDPI&F.

of an area. Lantana also invades roadsides, railway land and power line easements.

Economically

The total cost of controlling lantana in agricultural and non agricultural areas has been conservatively estimated at more than \$22 million per annum.

Life cycle

Germination can be year round but peaks after summer rains. Plants mature in one year, but they must complete one whole season before seeding. Vegetative spread can produce dense thickets.

In warm and humid areas lantana can flower and fruit almost year round, as long as soil moisture is available. A single plant can produce up to 12 000 fruit each year. Each fruit contains a single seed.

Lantana can survive in some drier areas where occasional soaking rains (25 mm) will trigger a flush of flowering followed by fruiting after four to six weeks.

Growth is limited by low light and temperatures, waterlogging and salinity.

Lantana can survive drought conditions by dropping its leaves. Dry lantana can appear to be dead but will reshoot from the base of the stem after rain. Frost affected lantana can also reshoot after spring rains. Dry or frost conditions provide ideal opportunities for control (see 'Control and management' section).

Spread

Movement of water, contaminated soil and machinery, deliberate planting and poorly disposed garden waste can help lantana spread.

Fruit eating birds are the main cause of lantana spread. Birds and some mammals eat the fruit and the seed in their droppings is viable. Studies have shown that germination of lantana seed is more likely if the seed has travelled through the gut of a bird or mammal.

Lantana can also spread vegetatively. Lantana has a shallow root system forming a dense root mat that grows mainly within the top 10–30 cm of soil. The plant does not sucker from damaged or broken roots but will regrow vigorously from the base of stems. Horizontal stems are able to take root when they contact moist soil. Lantana will also shoot from the base of vertical stems.

Some studies have shown that 50 per cent of seed will remain viable in dry conditions for up to two years; unpublished studies have shown seed to last five years. The length of time is likely to depend on variety, soil type and soil moisture levels.

Seeds need warm temperatures and sufficient moisture to germinate. Germination is reduced by

low light conditions. Activities that increase light and soil temperature will stimulate germination of lantana seed. These include clearing and burning of vegetation or even animal activity such as pig rooting and rabbit burrowing.

Control and management

Integrated Management

Integrated weed management uses a range of control methods in order to achieve more effective control. Lantana can be controlled by using a combination of manual control, mechanical control, herbicides, fire, pasture improvement, and grazing management techniques. Variables such as seasonal conditions and lantana varieties must be considered when planning control strategies. For example, lantana must be actively growing for foliar herbicide applications, and fire and biological control agents may be effective only at certain times of the year.

Lantana is an extremely hardy and persistent weed. Follow up control is always required to prevent re-infestation by regrowth or new seedlings. Prioritise control work in situations where there will be enough resources to allow ongoing control in the following months or years. Removing lantana can be a waste of time unless follow up management is carried out.

For integrated control strategies in various situations see the lantana control manual (see 'Further information').

Manual control

Manual control methods include hand grubbing (of individual plants, regrowth, or frost affected plants); hand cutting (to create access through thickets to carry out other control methods); and hand pulling (of seedlings and regrowth stems).

Manual control methods are effective for small infestations or scattered clumps over large areas, especially where machinery and vehicles cannot access. Manual control minimises soil disturbance and damage to desirable vegetation.

Mechanical control

Control with mechanical methods can be suitable for extensive mature lantana infestations. See the lantana control manual (see 'Further information') for details on managing large infestations.

Mechanical control by bulldozing or slashing plants can be successful for removing large mature bushes quickly. Mechanical control needs to be followed up by herbicide control of seedlings and replacing the lantana with pasture or other vegetation cover. Follow-up spot spraying or further mechanical control is therefore essential until the preferred desirable species becomes dominant.

Care should also be taken when mechanically clearing areas on steep land or near stream banks to prevent soil erosion. Avoid clearing or disturbing large areas at any one time to avoid leaving bare ground.

Pasture management

Grazing lantana itself is not recommended as goats, sheep, cattle and horses are susceptible to lantana poisoning (see 'Toxicity').

Proper grazing management of pastures is a preventative technique for many pasture weeds including lantana. Overstocking and overgrazing will lead to pasture degradation and allow the invasion of weedy species. Allowing a bulk of pasture to remain in the paddock all year round under normal weather conditions will help to prevent the establishment of weeds such as lantana.



Figure 9. Mechanical and manual removal are important parts of integrated weed management. Photos: D. Stock, QDPI&F; A. Johnson.

Oversowing treated areas with suitable pasture mixes will provide competition for emerging lantana seedlings. Consult your local agronomist for a suitable pasture improvement program.

Fire

Fire can be used to reduce the height and density of lantana thickets. However, fire rarely kills lantana plants. Plants recover quickly, reshooting from the bases of stems, so follow-up spot spraying with herbicide is necessary. Risks associated with using fire include destruction of desirable vegetation and pastures. Fire can also leave the soil exposed which can lead to erosion.

Chemical

Control with herbicides can be a practical, effective and efficient method of lantana management. They are cost effective for smaller infestations and for treating regrowth.

The effectiveness of herbicides depends on the lantana type. Pink flowered lantana is usually successfully controlled with herbicide, while success with the red flowered varieties is varied.

A number of herbicides are registered for the control of lantana. See the NSW DPI publication *Noxious and Environmental Weed Control Handbook* for details.

When selecting an appropriate herbicide, consideration should also be given to the application technique.

The aim should be to minimise off-target damage to native species and pasture grasses.

Plants can be sprayed at any time during the year, provided that they are actively growing and not under stress (e.g. spraying water stressed, cold affected, very wet or sick plants will be less effective). Best results have been achieved spraying in the early morning or late afternoon during the autumn months.

Depending on the size of the infestation and access to individual plants, foliar spraying, cut stump, and basal bark application techniques can all be effective.



Figure 10. White flowered *Lantana camara*.
Photo: A. Johnson

Foliar spraying

Foliar spraying is only effective if the lantana is actively growing and the plants are less than two metres high. Mature lantana is best treated with foliar spraying between February and the first frost.

Active regrowth from dry or frost affected lantana is ideal for treatment with foliar spraying as access to the regrowth foliage is easier and the reduced plant surface area requires less herbicide. Regrowth from burning, cutting, slashing or frost is best treated when it reaches a height of 30 cm to 1 m.

Basal bark application

Basal barking is the application of an oil soluble herbicide which is first mixed with diesel and then sprayed at low pressure or painted with a brush around the circumference of all the stems from the ground to a height of 30 cm. Basal barking can be effective on plants that have been defoliated by biological control agents and is effective at any time of year.

Cut stump

The cut stump method is where the stems are cut off completely at about 15 cm and herbicide is applied to the stump within 15 seconds. Lantana plants regrow vigorously from untreated cut stems so it is important to treat every cut stem.

Biological Control

Successful biological control of lantana has proven difficult. This is mainly due to the number of lantana varieties and the wide range of habitats that it invades.

Lantana was one of the first weeds in Australia to be targeted for biological control. Since it was recognised as a potential weed for biological control in 1914, 31 biological control agents have been introduced into Australia to help control lantana (30 insects and one type of rust). Of these, 17 have become established and four of these are effectively reducing the vigour and competitiveness of lantana in certain areas.

Biological control alone cannot eradicate lantana, but may help to contain infestations and reduce their spread in the long term.

A collaborative project between NSW and Queensland Government agencies started in 1996 to revive the biological control program. This program is partially funded by the NSW Lantana Biological Control Taskforce. Several new biological control agents have been funded and released as a result of this program.

Rust

The lantana rust (*Prospodium tuberculatum*) is a fungal pathogen that was introduced from Brazil in 2001. This rust attacks the widespread pink-flowering variety of lantana and appears to have a

wide tolerance of climatic conditions. While it is too early to determine how this agent will perform, there have been a number of pathogens released in other biological weed control programs that have been very successful.

Insects

The two insects causing the most damage are the leaf-mining beetles *Uroplata girardi* and *Octotoma scabripennis*. Larvae of both these insects mine leaves of all lantana types, thereby suppressing plant growth and causing a reduction in flowering.

Another insect that can damage the plant is the leafsucking bug, *Teleonemia scrupulosa*. The fourth insect that affects their growth is the lantana seed fly, *Ophiomyia lantanae*. Adults of this insect feed on the flowers while the larvae feed on the developing fruits and seeds.

Landholders do not need to collect insects and relocate them to their property. The most effective and proven biological controls have already spread throughout the areas they are suited to. Look for beetles or bugs on the tops or leaves, bugs or larvae underneath the leaves or insects in the flowers or on the fruit or stems. These insects act seasonally so they may cause damage at some times of the year and no damage at other times.

All other control methods except foliar spraying can be carried out when biological control agents are present.



Legislation

Lantana camara and *Lantana montevidensis* are both declared as Class 5 noxious weeds under the *NSW Noxious Weeds Act 1993*. This means they are prohibited from sale in any area of the State.

Both species are also declared as either a Class 3 or 4 noxious weed in most coastal councils (Figure 13).

Class 3 control requirements are that 'the plant must be fully and continuously suppressed and destroyed'.

Class 4 control requirements are that 'the growth and spread of the plant must be controlled according to the measures specified in a management plan published by the Local Control Authority.'

The responsibility for control of noxious weeds on private land rests with the landowner or occupier of the land.

A full list of noxious weeds and requirements under the *NSW Noxious Weeds Act 1993* can be found at www.dpi.nsw.gov.au/weeds

Further information

For more information, contact your local council weeds officer or an office of NSW DPI.

Lantana control manual: Current management and control of lantana (*Lantana camara*) in Australia, Queensland Department of Natural Resources, Mines and Energy, Brisbane.

Printed copies available from NSW DPI or download from www.weeds.org.au/WoNS/lantana



Figure 11 and 12. The lantana rust (*Prospodium tuberculatum*) and releasing the pathogen onto a lantana infestation. Photos: R. Holtkamp.

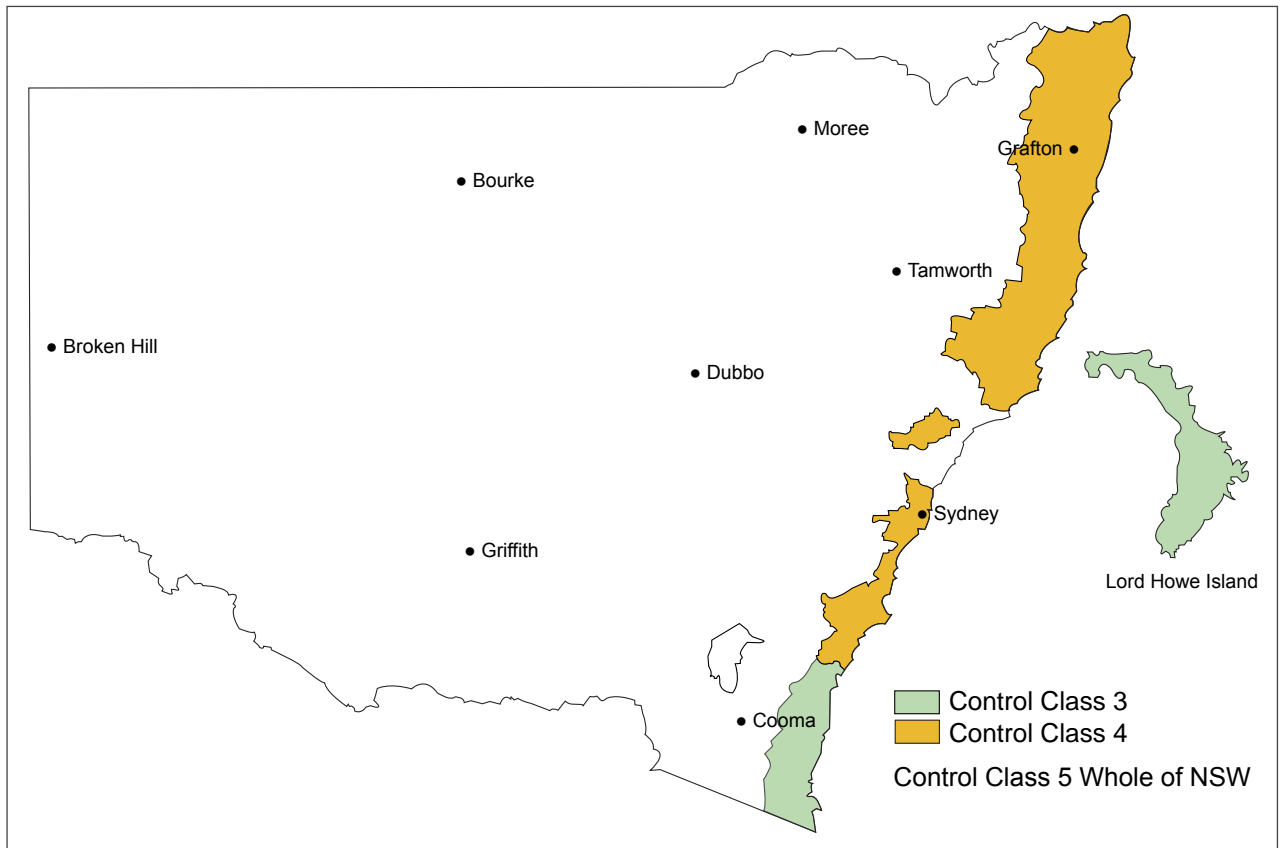


Figure 13. Areas of NSW where lantana is declared a noxious weed. Photo: A. Maguire.

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- NSW Agriculture (2001) *Managing Lantana*, Agfact P7.6.42.
- Agriculture & Resource Management Council of Australia and New Zealand, (2001) *Australia & New Zealand Environment Conservation Council and Forestry Ministers*.
- National Weeds Strategy Committee. *Weeds Of National Significance Lantana Strategic Plan*.
- Holtkamp, R. and Stephenson, P. (2001). *Biological Control of Lantana*, NSW Agriculture
- Swarbrick, J., Wilson, B. and Hannon-Jones, M. (1998) *Lantana Camara*, in *The Biology of Australia Weeds*. Vol 2; RG and FJ Richardson Melbourne, pp 119-136.
- Van Oosterhout, E. (2004), *Lantana control manual: Current management and control of lantana (Lantana camara) in Australia*, Queensland Department of Natural Resources, Mines and Energy, Brisbane.

Publications Available

A complete list of NSW DPI weed publications can be found at www.dpi.nsw.gov.au/weeds

Printed copies can be obtained by phoning the NSW DPI Bookshop on 1800 028 374.

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