Restricted category 3

Lantana

Lantana camara

Currently, lantana covers more than 5 million hectares of subcoastal New South Wales to Far North Queensland.

Lantana forms dense thickets that can smother and destroy native vegetation and are impenetrable to animals, people and vehicles.

Research indicates more than 1400 native species are negatively affected by lantana, including many endangered and threatened species. As lantana is a woody shrub that has thin, combustible canes, its presence can also create hotter bushfires, altering native vegetation communities and pastures.

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Legal requirements

All lantana species (*Lantana camara* and *Lantana montevidensis*) are category 3 restricted invasive plants under the *Biosecurity Act 2014*. They must not be given away, sold, or released into the environment. The Act requires everyone to take all reasonable and practical measures to minimise the biosecurity risks associated with invasive plants under their control. This is called a general biosecurity obligation (GBO).

At a local level, each local government must have a biosecurity plan that covers invasive plants in its area. This plan may include actions to be taken on lantana. Some of these actions may be required under local laws. Contact your local government for more information.

Description

Lantana is a heavily branched shrub that can grow in compact clumps, dense thickets or as a climbing vine.

The stems are square in cross section, with small, recurved prickles. Most leaves are about 6 cm long and are covered in fine hairs. They are bright green above, paler beneath and have round-toothed edges. Leaves grow opposite one another along the stem. When crushed the leaves produce a distinctive odour.

Flowers appear throughout most of the year in clustered, compact heads about 2.5 cm in diameter. Flower colours vary from pale cream to yellow, white, pink, orange and red. Lantana produces round, berry-like fruit that turn from glossy green to purplish-black when ripe.

Life cycle

Flowering and germination occurs all year round but peaks after summer rains. Several thousand seeds can be produced per square metre and these can remain viable for several years.

Research indicates some ornamental lantana varieties have the ability to set seed and can spread vegetatively. They also produce some viable pollen and have the potential to cross-pollinate with wild forms, creating new varieties that could naturalise in the environment.

If the number of naturalised varieties increase due to genetic drift from ornamental varieties, it will make finding effective biological control agents even more difficult and potentially extend the climatic tolerances and range of the weed's spread.

Methods of spread

Lantana spreads mostly through the garden ornamental trade and by fruit eating birds and mammals. It can also spread via a process known as layering, where horizontal stems take root when they are in contact with moist soil. It will also reshoot from the base of vertical stems.

Habitat and distribution

Lantana is native to the tropical and subtropical regions of North, Central and South America. Lantana is found throughout most coastal and subcoastal areas of eastern Australia, from the Torres Strait islands to southern New South Wales. It grows in a wide variety of habitats, from exposed dry hillsides to wet, heavily shaded gullies.

Toxicity

Many lantana varieties are poisonous to stock. It is difficult to tell which varieties are toxic so it is better to treat all forms as potentially poisonous. The toxins in lantana include the triterpene acids, lantadene A (rehmannic acid), lantadene B, and their reduced forms.

Most cases of lantana poisoning occur when new stock are introduced into lantana-infested areas. Stock bred on lantana-infested country avoid lantana unless forced to eat it due to lack of other fodder. Young animals introduced to lantana areas are most at risk.

Symptoms of lantana poisoning depend on the quantity and type of lantana consumed and, under some circumstances, the intensity of light to which the animals are exposed.

Early symptoms of depression are noticeable, with head swaying, loss of appetite, constipation and frequent urination. After a day or two the eyes and the skin of the nose and mouth start yellowing with jaundice, and the muzzle becomes dry and warm. The eyes may become inflamed and have a slight discharge. The animal also becomes increasingly sensitive to light. Finally, the muzzle becomes inflamed, moist and very painful ('pink nose'). Areas of skin may peel and slough off. Death commonly occurs 1–4 weeks after symptoms occur. Death from acute poisoning can occur 3–4 days after eating the plant.

If animals show any of the early symptoms, they should be moved to lantana-free areas, kept in the shade and monitored. Veterinary treatment should be sought immediately. Some remedies may include intravenous fluids, treating skin damage with antibiotics, or drenching with an activated charcoal slurry.

Care should be taken when introducing new or young animals into a paddock if lantana is present. Ensure they have enough fodder to stop them eating lantana in quantities sufficient to result in poisoning. During drought, animals should not be placed in lantana-infested areas without alternative food.

Control

Managing lantana

The GBO requires a person to take reasonable and practical measures to minimise the biosecurity risks posed by lantana. This fact sheet provides information and some options for controlling lantana.

A general principle is to commence control programs in areas of light infestations and work towards the denser infestations using a mix (integration) of control methods. Size, density and geographic location of infestations are important considerations for choosing which mix of control methods to use.

For large lantana infestations, treatment with herbicides by foliar spraying is usually not economically feasible. However, fire, dozing/stick raking, slashing/cutting and aerial helicopter spraying are options that can reduce dense infestations, making follow-up spot treatments with herbicides more economically viable.

Lantana seed banks remain viable for at least four years, so follow-up control to kill seedlings before they mature is vital to ensure initial management efforts to control the parent bush are not wasted.

Appropriate fire regimes may become part of a management program to ensure lantana invasiveness is reduced and pasture is maintained.

Removal of lantana within areas of remnant vegetation may require a permit under the *Vegetation Management Act 1999*. More information should be sought from the Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development before works commence.

Mechanical control

Stick raking or ploughing can be effective in removing standing plants. However, regrowth from stumps and/or increased seedling germination in disturbed soil is common and the site will require follow-up treatment.

Grubbing of small infestations—for example, along fence lines—can be a useful and effective method of removing plants, although this is time consuming. Repeated slashing can also reduce the vigour of lantana, exhausting its stored resources and reducing its likelihood of re-shooting.

Some locations—for example, very steep inclines or gullies— are not suitable for mechanical control options because of the danger of overturning machinery and soil erosion.

Fire

Regular burning will reduce the capacity of plants to survive; however, initial kill rates are variable. The effectiveness of this method will depend on the suitability of available fuel loads, fire intensity, temperature, relative humidity, soil moisture and season.

Pasture re-establishment can then provide competition to inhibit lantana seed germination. Fire is not recommended in non–fire tolerant vegetated areas such as rainforest, or wooded or plantation areas.

A typical control program for fire may include:

- exclude stock to establish a pasture fuel load
- burning (may require a permit)
- sow improved pastures—consult your local Biosecurity Queensland officer for advice
- continue to exclude stock until pasture has established and seeded
- burn again in summer before rain and spot spray Lantana camara regrowth when > 0.5 m high and when it is actively growing (see Table 1).

Biological control

Since 1914, 32 biological control agents have been introduced into Australia in an attempt to control lantana. Eighteen have established, of which several insect species cause seasonal damage, reducing the vigour and competitiveness of lantana in some areas.

Biosecurity Queensland research programs continue to investigate agents suitable for release in Australia, and test the viability of these agents in an effort to identify more effective biological control agents.

It is important to remember that biological control alone should not be relied upon for managing lantana infestations. Consideration should be given to other available control techniques. The four most important biological control agents are:

- **sap-sucking bug *(Teleonemia scrupulosa)*** Found in dry areas from Cooktown to Wollongong, the small, mottled bug feeds on the underside of leaves, growing tips and flower buds, causing the leaves to drop early and stop the plant from flowering.
- **leaf-mining beetle *(Uroplata girardi)*** Found in most lantana infestations from Cape Tribulation to Sydney as well as around Darwin, except in very dry or high altitude areas. The adult beetles are dark brown. They shelter in curled leaves and feed on the upper leaf surfaces. Larvae feed in leaves causing blotches to spread across the leaf. This beetle reduces plant vigour and can suppress flowering.
- **leaf-mining beetle (*Octotoma scabripennis*)** Found in most lantana infestations from Atherton to Wollongong. Adults of this species feed on the upper leaf surface, while larvae feed and mine the centre of the leaf and cause blotches. This activity reduces plant vigour and can suppress flowering.
- **seed-feeding fly *(Ophiomyia lantanae)*** Found from Cape Tribulation to Eden in New South Wales and also around Darwin and Perth. *Ophiomyia* is a small black fly that feeds on flowers and lays eggs on the green fruits. The maggots of the fly eat the seed and make the fruit unattractive to birds, reducing seed spread.

Other agents such as *Aconophora compressa* (a stem-sucking bug) and *Leptobyrsa decora* (a sap-sucking bug) have caused some damage in specific geographic areas.

Note: Landholders are advised not to consume their time collecting established insects for distribution. Due to their own ability to disperse, these insects will be periodically/seasonally present in areas that are climatically suitable for them.

Herbicide control

Herbicide recommendations for lantana are shown in Table 1. Users of herbicides have a legal obligation to read herbicide labels and use only the registered rates.

Variation in results can be a result of inconsistent application methods, mix rates or seasonal variation. Red-flowered and pink-edged red-flowered lantana are often considered the most difficult to control because their leaves are often smaller and tougher. However, herbicides can kill these varieties if you carefully follow application procedures.

For single-stemmed lantana, basal bark spraying and cut stump methods also give good results at any time of year (but best when the plant is actively growing). On multi-stemmed varieties, you will obtain best results by carefully applying herbicide to each stem.

When treating actively growing plants less than 2 m high, overall spraying of foliage to the point of run-off is recommended. Splatter gun techniques are also effective and particularly useful in hard-to-access areas. This is best done in autumn—when sap flows draw the poison down into the root stock, but before night temperatures get too cold.

Remove grazing animals from spray areas during and soon after treatment. Stress can cause increased sugar levels in the leaves of lantana plants, making them more palatable.

Landholders and contractors should check if the property is situated in a hazardous area. This prevents the use of some herbicides, as defined in the *Agricultural Chemicals Distribution Control Act 1966.*

More information

Contact your local government office for more information or visit biosecurity.qld.gov.au.

Table 1. Herbicides for control of lantana

Situation	Herbicide	Rate	Comments	
Agricultural non-crop areas, commercial and industrial areas, forests, pastures and rights-of-way	Fluroxypyr 200 g/L (e.g. Fluroxypyr 200)	500 mL to 1 L/100 L water	October to April	Thorough wetting of plants is required, lower rate for seedlings and regrowth 0.5–1.2 m high, higher rate for plants and regrowth 1.2–2 m high.
	Fluroxypyr 333 g/L (e.g. Starane Advanced)	300–600 mL/100 L water		
	Fluroxypyr 400 g/L (e.g. Flagship 400)	250–500 mL/100 L water		
Domestic areas, commercial, industrial and public service areas, agricultural non-crop areas, forests and rights-of-way	Glyphosate 360 g/L (e.g. Roundup Biactive)	1 L/100 L water	October to April	Wet plant thoroughly. Glyphosate affects any green plant it comes into contact with. Glyphosate is available in a range of strengths. Consult labels for rates for other glyphosate formulations.
	Glyphosate 450 g/L (e.g. Glyphosate 450)	800 mL/100 L		
	Glyphosate 540 g/L (e.g. Knockout Pro)	660 mL/100 L		
	Glyphosate 700 g/kg (e.g. Macspred Glymac Dri 700)	500 g/100 L		
Agricultural non-crop areas, commercial and industrial areas, pastures and rights-of-way	2,4-D 300 g/L + Picloram 75 g/L (e.g. Enforcer 75–D)	650 mL/100 L water	March to May	Thoroughly wet foliage and soil around base of plant. Legumes are affected if sprayed.
Agricultural non-crop areas, commercial and industrial areas, forests, pastures and rights-of-way	Triclopyr 300 g/L + Picloram 100 g/L + Aminopyralid 8 g/L (e.g. Grazon Extra)	350–500 mL/100 L water	Summer to autumn	Wet plant thoroughly. Use the higher rate on plants over 1 m high. Legumes may be affected if sprayed.
	Triclopyr 300 g/L + Picloram 100 g/L (e.g. Conqueror)	350–750 mL/100 L water		
Native conservation areas, pastoral grazing land, industrial sites such as railways, roadways, and utility rights-of-way	Aminocyclopyrachlor 240 g/L (Method 240)	200–500 mL/100 L water	March to May	Spot spray with handgun or backpack sprayer. Use sufficient spray volume for thorough coverage.
Pastures, rights-of-way and industrial areas	2 ,4-D amine 625 g/L (e.g. Ken-Amine 625)	320 mL/100 L water	March to May	Use a coarse spray with sufficient pressure to penetrate canopy and wet stems as well as foliage. Defoliation should occur but respraying of new growth will be necessary in following Autumn. Broadcast grass seed and keep stock off in following Summer to allow the pasture to establish. Damage may result to pasture legumes. Red-flowered lantanas are more resistant to 2,4-D.
	2 ,4-D amine 700 g/L (e.g. Amicide Advance 700)	285 mL/100 L water Consult labels for other formulations		
Native pastures, rights-of-way, commercial and industrial areas	Metsulfuron-methyl 600 g/kg (e.g. Associate)	10 g/100 L water plus wetter	March to May	Plants up to 2 m high. Thoroughly wet all foliage and stems. Spray should penetrate throughout the bush. Addition of a wetting agent e.g. Pulse is recommended. Results variable. Not found effective in tropics. Follow-up sprays are necessary.
Native pastures, rights-of-way, commercial and industrial areas	Glyphosate 360 g/L (e.g. Weedmaster Duo) + Metsulfuron-methyl 600 g/L (e.g. Associate)	400 mL glyphosate + 3 g metsulfuron/ 100 L water	March to May	Apply to actively growing bushes up to 2 m high. Spray to thoroughly wet all foliage and stems. Spray to penetrate throughout the bush. Do not apply during periods of summer drought stress. Addition of a wetting agent e.g. Pulse is recommended.
Agricultural non-crop areas, commercial and industrial areas, forests, pastures and rights-of-way	Fluroxypyr 140 g/L + Aminopyralid 10 g/L (e.g. Shotup)	500–700 mL /100 L water	October to April	Apply to actively growing plants. Spray all foliage, including stems, to the point of run-off. Use the lower rate on seedlings and regrowth 0.5–1.2 m high and the higher rate on plants 1.2–2 m high.
	(i) Basal bark (ii) Cut stump			
	Glyphosate 360 g/L (e.g. Weedmaster Duo)	Undiluted	Any time Best results when actively growing	APVMA permit PER11463 (expires 30/04/2027) Prior to using the herbicides listed under PER11463 you must read or have read to you and understand the conditions of the permit. To obtain a copy visit apvma.gov.au.

Table 1. Herbicides for control of lantana (continued)

Situation	Herbicide	Rate		Comments
	Triclopyr 600 g/L (e.g. Garlon 600)	1 L/60 L diesel		Apply to lower 40 cm of every stem. Must ensure complete coverage around stem. Cut close to ground level and immediately apply herbicide.
	Triclopyr 240 g/L + Picloram 120 g/L (e.g. Access)			
	Splatter gun			
	Glyphosate 360 g/L (e.g. Weedmaster Duo)	1:9 glyphosate + water	October to April	Apply 2 x 2 mL dose per 0.5 m height of lantana. Addition of Pulse Penetrant may improve control.
	Metsulfuron methyl 600 g/L (e.g. Associate)	2 g/L water	March to May	
	Aerial			Follow label directions for equipment and other requirements for aerial application.
Agricultural non-crop areas, commercial and industrial areas, forests, pastures and rights-of-way	Triclopyr 300 g/L+ Picloram 100 g/L (e.g. Conqueror) or Triclopyr 300 g/L + Picloram 100 g/L + Aminopyralid 8 g/L (e.g. Grazon Extra)	10 L/ha	When actively growing	Helicopter only. Minimum of 200 L water per ha. Follow-up re-spray will be required. Do not burn within six months of treatment.
	Triclopyr 300 g/L + Picloram 100 g/L (e.g. Conqueror) + 2,4-D amine 625 g/L (e.g. Ken-Amine 625)	1.5 L + 6 L 2,4–D/ha		Helicopter only. Minimum of 150 L water per ha. Follow-up re-spray will be required. Do not burn within six months of treatment.
	Triclopyr 300 g/L + Picloram 100 g/L + Aminopyralid 8 g/L (Grazon Extra) + 2,4-D amine 625 g/L (e.g. Ken-Amine 625)	1.5 L + 5.2 L 2,4-D/ha		
Commercial and industrial areas, forests, pastures and rights-of-way	Glyphosate 360 g/L (e.g. Weedmaster Duo) + Metsulfuron-methyl 600 g/L (e.g. Associate	4 L glyphosate + 30 g metsulfuron/ha		Do not use on alkaline soils or during periods of summer drought stress. Use Pulse Penetrant at the rate of 500 mL/100 L of water.
Natural ecosystems (non-agricultural)	Glyphosate 360 g/L (e.g. Weedmaster Duo)	1:50 (product: water)		Aerial spot spray from helicopter or unmanned aircraft vehicles.
	Metsulfuron-methyl 600 g/L (e.g. Associate)	1–2 g/10 L water		APVMA permit PER12363 for use by staff/ contractors of government agencies, QPWS, or NRM groups.

[1]Optimum times are only a guide. Lantana must be actively growing for the herbicide to work. Labels often recommend the additional use of a wetting agent or surfactant within the mix. Herbicides types vary in their selectivity against other species and soil residual.

Read the label carefully before use and always use the herbicide in accordance with the directions on the label.

Fact sheets are available from biosecurity.qld.gov.au. The control methods recommended should be used in accordance with the restrictions (federal and state legislation, and local government laws) directly or indirectly related to each control method. These restrictions may prevent the use of one or more of the methods referred to, depending on individual circumstances. While every care is taken to ensure the accuracy of this information, the department does not invite reliance upon it, nor accept responsibility for any loss or damage caused by actions based on it.