

# Prickly pear

*Opuntia*, *Nopalea* and *Acanthocereus* spp.



The introduction and spread of prickly pears into Queensland and New South Wales is one of the greatest environmental invasions of modern times.

Prickly pears were introduced into pastoral districts in the 1840s. By 1900, over 4 million hectares in Queensland and New South Wales was infested by prickly pear. By 1925, the pest had invaded over 24 million hectares. Control costs were prohibitive and the only effective herbicide at the time was hazardous. This resulted in landholders abandoning large tracts of land.

Research for biological control agents commenced in 1912, and in 1914 cochineal insects were released to control one of the minor prickly pear species. Control of this minor prickly pear species by these introduced insects occurred within a few years.

The success of the cochineal insects led to renewed efforts against other types of prickly pear in the 1920s. These efforts resulted in the control of the major pest prickly pear by the moth *Cactoblastis cactorum*; by the mid-1930s, prickly pear was no longer a major problem.

Several prickly pear species have since remained as minor weeds.



Queensland Government

## Declaration details

Prickly pear (*Opuntia* spp.) is a declared Class 1 plant under the *Land Protection (Pest and Stock Route Management) Act 2002*. *O. ficus-indica* is not declared. *O. stricta*, *O. aurantiaca*, *O. monacantha*, *O. tomentosa* and *O. streptacantha* species are Class 2 declared pest plants and all other species are declared Class 1.

## Description and general information

‘Prickly pear’ is a general term used to describe some plants of the Cactaceae family. The term includes species of *Opuntia*, *Nopalea* and *Acanthocereus*. All of these plants originate in the Americas. The term ‘prickly pear’ relates to the fruit that is often spiny and pear-shaped. Plants are normally leafless succulent shrubs. Stems are divided into segments (pads or joints) that are flat and often incorrectly called leaves.

Young shoots have true leaves resembling small fleshy scales that fall off as the shoot matures.

Flowers are large, normally seen during spring and can be yellow, orange, red, pink, purple or white depending on the species. Prickly pear fruits vary between species and can be red, purple, orange, yellow or green.

Areoles (spots with clusters of spines) are found on both the pads (joints, segments) and fruit. In addition to spines, areoles often have clusters of sharp bristles (glochids) and tufts of fibre (‘wool’). Each areole contains a growing point that can produce roots or shoots.

## Life cycle

Prickly pears have several features that enable them to compete and become pests.

Prickly pears are drought resistant because of their succulent nature, their lack of leaves and their thick, tough skins. These features result in plants that use the majority of their internal tissues for water storage and their outer parts to reduce water loss and damage by grazing and browsing animals. They can remain vigorous in hot, dry conditions that cause most other plants to lose vigour or even die. Some species develop underground bulbs that enable the plant to resist fire and mechanical damage.

Prickly pears reproduce both sexually and asexually. Birds and other animals readily eat the many seeded fruits and deposit seeds in their droppings. Seeds have hard seed coats that allow them to survive heat and lack of water. Asexual reproduction (cloning) of prickly pears occurs when pads (joints, segments) or fruits located on the ground take root and produce shoots. Animals and floods move broken pads long distances. These pads can survive long periods of drought before weather conditions allow them to set roots.

## Habitat and distribution

Prickly pears considered pests in Queensland are:

- Common pest pear (*Opuntia stricta* var. *stricta* (= *O. inermis*))
- Spiny pest pear (*Opuntia stricta* var. *dillenii* (= *O. stricta*))
- Tiger pear (*Opuntia aurantiaca*)
- Drooping tree pear (*Opuntia vulgaris* (= *O. monacantha*))
- Velvety tree pear (*Opuntia tomentosa*)
- Westwood pear (*Opuntia streptacantha*)
- Devil’s rope pear (*Opuntia imbricata*)
- Coral cactus (*Opuntia cylindrica*)
- Snake cactus (*Opuntia fulgida* X *O. imbricata*)
- Sword pear (*Acanthocereus pentagonus*)

### Common pest pear (*Opuntia stricta* var. *stricta*)

This bushy, spreading plant grows up to 1.5 m high and forms large clumps. The stems are divided into oval, blue-green spineless pads 20 cm long and 10 cm wide. Areoles are in diagonal lines along the pads 2.5 cm to 5 cm apart and have a cushion of brown wool containing bristles but usually no spines. When spines occur they are stout, yellow and up to 4 cm long.

Common pest pear produces flowers that are 7.5 cm wide, bright lemon yellow and green at the base. The fruit is oval-shaped, has a deep cavity on one end and tapers at the other. Fruit is purple, 6 cm long and 3 cm wide, with carmine-coloured (dark red) seeds and a fleshy pulp.

Common pest pear is found as small to large clumps of varying density. The clumps are usually broken up by the action of *Cactoblastis cactorum*. Common pest pear occurs throughout most of central and southern Queensland and is still spreading westwards. It is often found along beaches and on offshore islands.

### Spiny pest pear (*Opuntia stricta* var. *dillenii*)

This succulent shrub grows 1–2 m high. The stems are hairless and bluish-green or dull green. The stems are divided into pads up to 30 cm long, 15 cm wide and 1–2 cm thick. The areoles have tufts of short and finely barbed bristles accompanied by one or two yellow spines between 2 cm and 4 cm long. Small scale-like leaves are found on areoles of immature pads.

Spiny pest pear produces 6–8 cm wide flowers that are lemon yellow with green or pink markings on the back. The fruit is pear-shaped and about 4–6 cm long with a red-purple skin. The areoles located on fruits have fine, barbed bristles. The red flesh of fruits contains rounded seeds that are yellow or pale brown.

While this prickly pear once formed large-scale dense infestations, it is now found as small clumps or as scattered plants. These clumps are usually broken by the action of *Cactoblastis cactorum*. It is found in eastern central Queensland, the Burnett district, the Darling Downs and south-eastern Queensland.

### **Tiger pear (*Opuntia aurantiaca*)**

This succulent low shrub with underground tubers usually grows 30–60 cm high. The stems are divided into very spiny, slightly flattened pads that are 1–30 cm long and 1–5 cm wide. The stems are dark green to purple and red in colour. The areoles have 3–7 brown barbed spines up to 4 cm long surrounded by tufts of short, fine bristles. The pads detach easily and are transported on the skins of animals. Small and scale-like leaves are found on areoles of immature pads.

Tiger pear produces 6 cm wide yellow flowers. The rarely formed fruits are pear-shaped and about 2.5 cm long. When ripe, they are red with purple markings.

Dense tiger pear forms an impenetrable spiny groundcover and is prevalent in southern Queensland but extends into central Queensland.

### **Drooping tree pear (*Opuntia vulgaris*)**

This erect succulent shrub with fibrous roots grows up to 5 m high but is usually 2–3 m high. The branches are divided into glossy light green pads up to 45 cm long, 15 cm wide and 1.5 cm thick. The dark grey trunk grows up to 25 cm in diameter. Drooping tree pear gets its name because the upper segments tend to droop. The areoles on the older pads have 1–5 sharp spines about 5 cm long.

Small, scale-like leaves are found on areoles of very young pads that are quickly shed as the pad grows. Drooping tree pear produces yellow flowers that are 6 cm wide and have red markings on the back. The fruit is pear-shaped and 4–7 cm long with a green skin. The flesh of the fruit is red, pulpy and contains round seeds that are yellow or pale brown. The fruits have areoles with tufts of fine, barbed bristles.

Dense thickets result when drooping tree pear is allowed to grow freely. Small scattered infestations occur in the south-east corner of Queensland and in coastal northern Queensland.

### **Velvety tree pear (*Opuntia tomentosa*)**

This tree-like plant forms a central woody trunk over 40 cm wide and grows up to 5 m high. The stems are divided into oblong pads that are dull green and velvety to touch due to the dense covering of short fine hairs. The pads are 15–35 cm long, 8–12 cm wide and 1.5–2 cm thick.

Young plants have 2–4 white or pale yellow spines located in the areoles with one spine reaching a length of 2.5 cm. The areoles usually become spineless as the plant matures. A more spiny variety does exist and has more than 50 spines in each areole on the trunk.

The flowers are a deep orange. The fruit is egg-shaped, about 5 cm long and 3 cm wide, and dull red. The top of the fruit is saucer-shaped with circular lines that meet in the centre and give the fruit a shrivelled appearance. The fruit produces many seeds within a reddish pulp.

Velvety tree pear is found predominantly throughout the brigalow belt of Queensland and is still extending its range. It is occasionally found as dense shrubs, but more usually as small clumps of trees or as trees scattered over the landscape.

### **Westwood pear, Cardona (*Opuntia streptacantha*)**

Westwood pears are shrub-like or tree-like plants that form clumps by branching from the base. They are usually 2–4 m high. The stems are divided into almost circular dull green pads, 25–30 cm long and 15–20 cm wide. The areoles have white spines that vary in number and size when the plant matures.

Young pads have 2–5 white spines 1–2 cm long, accompanied by two hair-like spines 0.5 cm long in the lower part of the areole. Spines increase in number (up to 20) and size (5 cm long) in areoles along the trunk of the plant.

The flowers are yellow and fruits are barrel-shaped, 6 cm long and 5 cm wide with a flat top. The fruit has a purple skin and a rind that is 1 cm thick. Fruits contain red seeds buried in a dark red (carmine) pulp.

Westwood pear is found in eastern central Queensland as small clumps or as plants scattered over the landscape.

### **Devil's rope pear (*Opuntia imbricata*)**

This open branching shrub grows 1.5–3 m high. The stems are divided into hairless, dull green, cylindrical pads that vary up to 37 cm in length and are 3.5–5 cm thick. The pads have a series of short raised ridges that give them a twined, rope-like appearance. The areoles are found on these ridges and produce 3–11 pale yellow or white spines, with the longest being 2.5 cm long. Papery sheaths cover these spines.

The flowers are a dull, red-purple colour and found at the ends of pads. The yellow fruit resembles a small, 5 cm wide custard apple and has a spineless areole at the top.

Devil's rope pear occurs in Queensland as a small infestation at Gladfield.

### Coral cactus (*Opuntia cylindrica*)

Coral cactus grows as a branching shrub 1–1.5 m in high. The stems of coral cactus are divided into green cylinder-like pads that are fist-like and obtuse at their apex. Mature coral cactus pads widen, become distorted and wavy, and resemble a piece of coral. Areoles along the pads have a number of short white spines.

Coral cactus produces small (1–2 mm wide) scarlet flowers. The fruit is yellow-green and 2–5 cm wide.

Coral cactus has been located near Mount Isa, Longreach, Wyandra, Eulo and Hungerford but its potential spread includes all of far western Queensland.

### Snake cactus (*Opuntia fulgida* X *O. imbricata*)

This open branching shrub grows 1–2 m high. The stems are divided into hairless, dull green, cylindrical pads that vary up to 20 cm in length and are 3.5–5 cm thick. The pads have a series of short raised ridges that give them a twined rope-like appearance. The areoles are found on the bottom of these ridges and produce 5–10 pale yellow to brown spines, with the longest being 3 cm long.

The flowers are light red to dark rose and commonly 5–7 cm wide. Snake cactus produces fruit that is yellow and 2–5 cm wide.

Snake cactus has been located near Longreach but its potential spread includes all of north-western Queensland.

### Sword pear (*Acanthocereus pentagonus*)

This elongated branching shrub grows in clumps up to 4 m high. The stems are erect, up to 1.5 m long, 3–8 cm wide and divided into many joints. Sword pear stems are three-, four- or five-angled and resemble star-picket posts. The areoles are found on the edges of the joints and produce many white spines 1–4 cm long.

The flowers are white, funnel-shaped and 14–20 cm long. The flowers open at night between spring and summer. Sword pear produces bright red sphere-shaped fruits that are 5 cm in diameter. The fruit has a red pulp and black seeds.

Sword pear occurs in the Gogango area west of Rockhampton.

## Control

### Biological control

Investigations into biological control agents against prickly pears began in 1912. Over 150 insect species were studied throughout the world, with 52 species selected for transport to Queensland. Following intensive host specificity testing, 18 insects and one mite were released in Queensland. Nine insects and the mite remain established in Queensland. These species are:

- *Cactoblastis cactorum*, a stem-boring moth
- *Dactylopius ceylonicus*, a cochineal mealybug
- *Dactylopius opuntiae*, a cochineal mealybug
- *Dactylopius confusus*, a cochineal mealybug
- *Dactylopius tomentosus*, a cochineal mealybug
- *Dactylopius austrinus*, a cochineal mealybug
- *Chelinidea tabulata*, a cell-sucking bug
- *Tucumania tapiacola*, a stem-boring moth
- *Archlagocheirus funestus*, a stem-boring beetle
- *Tetranychus opuntiae*, prickly pear red spider mite.

These biological control agents continue to keep several prickly pears under control. It is important to remember not all the agents attack all prickly pears.

The most successful of these species were the moth *Cactoblastis cactorum* and five cochineal mealybugs—*Dactylopius ceylonicus*, *D. opuntiae*, *D. confusus*, *D. tomentosus* and *D. austrinus*. The other agents are still around but not in sufficient numbers to provide control.

### *Cactoblastis cactorum* (cactoblastis moth)

Larvae of this moth were introduced from Argentina in 1925. *Cactoblastis* proved to be the most effective agent against the common and spiny pest pears, destroying massive infestations in Australia. Larvae keeps these two pest pears controlled to an acceptable level most of the time, although it is less effective in some coastal and far western areas.

The larvae collectively eat out the contents of the pads leaving empty pad skins and piles of mushy droppings. The orange and black larvae are occasionally observed on the outsides of pads. *Cactoblastis* also attacks most types of prickly pear but is not effective against them.

### *Dactylopius* spp. (cochineal insects)

All female cochineal insects are small, sessile mealy bugs that spend their adult lives permanently attached to their host plants sucking plant juices. They are covered by a fine, white, waxy secretion and when crushed yield a carmine colouring. The adult males are small, free-flying insects that do not feed.

### *Dactylopius ceylonicus* (monacantha cochineal, Argentine cochineal)

This South American mealy bug was released in 1914 and 1915 to control drooping tree pear. It destroyed the dense infestations existing at that time. It is specific to drooping tree pear and today remains the only effective biological control agent for drooping tree pear. This insect needs to be distributed manually.

### ***Dactylopius opuntiae* (prickly pear cochineal)**

This mealy bug was introduced from Mexico and southern United States between 1920 and 1922. It is effective against common pest pear, spiny pest pear, velvety tree pear and Westwood pear and remains the main biological control agent against velvety tree pear and Westwood pear. This insect spreads slowly in nature and can be assisted manually.

### ***Dactylopius confusus* (prickly pear cochineal)**

This mealy bug was introduced from Florida and released in 1933 against spiny pest pear. It remains effective against spiny pest pear in central Queensland but spreads slowly. This insect can be spread manually.

### ***Dactylopius tomentosus* (devil's rope pear cochineal)**

This mealy bug was introduced from southern United States in 1925 and 1926. It is effective against devil's rope pear but works slowly.

### ***Dactylopius austrinus* (tiger pear cochineal)**

This mealy bug was introduced from Argentina in 1932. It is specific to and effective against tiger pear. It rapidly reduces tiger pear populations but dies out in a paddock after the destruction of tiger pear. It needs to be reintroduced after tiger pear regrows.

### ***Chelinidea tabulata* (prickly pear bug)**

This plant-sucking bug was introduced from Texas in 1921. It was effective against dense common pest pear before *Cactoblastis cactorum* was but is now relatively ineffective. This insect also attacks most other prickly pears. The adult is a pale brown bug up to 20 mm long that leaves characteristic round bleached spots on the surface of the cactus.

### ***Tucumania tapiacola* (prickly pear moth-borer)**

This moth was introduced from Argentina in 1934 against tiger pear. Its solitary larvae feed internally and eat out tiger pear pads with limited effect. It has been observed attacking common pest pear and harrisia cactus.

### ***Archlagocheirus funestus* (tree pear beetle)**

This stem-boring beetle was introduced from Mexico in 1935. It was effective against velvety tree pear and Westwood pear but has become rare since the dense stands of these prickly pears have gone.

### ***Tetranychus opuntiae* (prickly pear spider mite)**

This mite was introduced from southern United States and Mexico in 1922. It was effective against common pest pear but is now rare and difficult to find. It causes distinctive scar tissue formation around areoles.

## **Distributing biological control agents**

### **Cactoblastis**

Cactoblastis can be spread manually by distributing eggs or larvae. Cactoblastis moths lay chains of eggs (eggsticks) on prickly pear pads from January–February and September–November. The eggsticks are distinguished from spines by their curved appearance.

1. Collect the fragile eggsticks carefully.
2. Glue single eggsticks to small pieces of paper using a starch-based adhesive.
3. Pin the egg papers to prickly pear pads. (Eggs take up to one month to hatch.)
4. Collect pads or plants in which larvae are obviously still active.
5. At a release site place all the collected plant material in a small part of the infestation.
6. Subsequent generations of moths will disperse through the infestation.
7. Follow up the biological control with either herbicide or mechanical treatment.

### **Cochineals**

Because several cochineal insects affect some prickly pears and not others, it is essential to know what prickly pear you wish to control.

1. Identify your prickly pear type.
2. Find the same prickly pear type which is being attacked by a cochineal.
3. Collect pads of the prickly pear with the insects.
4. Place affected pads against unaffected prickly pears at the release site.
5. Follow up the biological control with either herbicide or mechanical treatment.

### **Tiger pear cochineal**

Tiger pear cochineal is easy to multiply quickly after collection.

1. Carefully collect a reasonable quantity of unaffected tiger pear in a container (box or bucket).
2. Place a few pieces of cochineal-affected tiger pear into the same container.
3. Cover the container with a cloth and store under cover for a few weeks.
4. Check the cactus occasionally.
5. When most of the tiger pear in the container has cochineal, it is ready to distribute.
6. At the release site place affected pads against unaffected prickly pears.
7. Follow up the biological control with either herbicide or mechanical treatment.

Note: It is best to multiply tiger pear cochineal before release.

## Mechanical control

Mechanical control using machinery is difficult because prickly pear pads can easily re-establish. A hot fire is an effective control method for dense prickly pear infestations. Before burning, consult Biosecurity Queensland to see if this practice is suitable for your pasture and land management practices.

## Herbicide control

Herbicide options available for the control of prickly pears in Queensland are shown in Table 1.

Landholders and contractors should check if the property is in a hazardous area as defined in the *Agricultural Chemicals Distribution Control Act 1966* prior to spraying.

## Further information

Further information is available from your local government office or from your local biosecurity officer. Contact details are available through 13 25 23.

**Table 1 Herbicides registered for the control of prickly pears**

Pest name	Situation	Herbicide	Rate	Method
Common prickly pear	Agricultural land—non-crop	Triclopyr (240 g/L) + picloram (120 g/L)	1 L/60 L diesel	Basal bark/cut stump
		Triclopyr (600 g/L)	3 L/100 L or 0.8 L/60 L diesel	
	Forests—timber production	Triclopyr (240 g/L) + picloram (120 g/L)	1 L/60 L diesel	Basal bark/cut stump
		Triclopyr (300 g/L) + picloram (100 g/L)	0.5 L/100 L	
		Triclopyr (600 g/L)	3 L/100 L or 0.8 L/60 L diesel 3 L/100 L or 1 L/75 L diesel	Basal bark/cut stump Foliar
	Land—commercial/industrial/public	Triclopyr (240 g/L) + picloram (120 g/L)	1 L/60 L diesel	Basal bark/cut stump
		Triclopyr (300 g/L) + picloram (100 g/L)	0.5 L/100 L	
		Triclopyr (600 g/L)	3 L/100 L or 0.8 L/60 L diesel 3 L/100 L or 1 L/75 L diesel	Basal bark/cut stump Foliar
	Land—non-agricultural	Triclopyr (300 g/L) + picloram (100 g/L)	0.5 L/100 L	
		Triclopyr (600 g/L)	3 L/100 L or 0.8 L/60 L diesel	Basal bark/cut stump
	Land—rights of way	Triclopyr (240 g/L) + picloram (120 g/L)	1 L/60 L diesel	Basal bark/cut stump
		Triclopyr (300 g/L) + picloram (100 g/L)	0.5 L/100 L	
		Triclopyr (600 g/L)	3 L/100 L or 0.8 L/60 L diesel 3 L/100 L or 1 L/75 L diesel	Basal bark/cut stump Foliar
	Pastures	Triclopyr (240 g/L) + picloram (120 g/L)	1 L/60 L diesel	Basal bark/cut stump
		Triclopyr (300 g/L) + picloram (100 g/L)	0.5 L/100 L	
		Triclopyr (600 g/L)	3 L/100 L or 0.8 L/60 L diesel 3 L/100 L or 1 L/75 L diesel	Basal bark/cut stump Foliar
Coral cactus	Agricultural land—non-crop	Triclopyr (240 g/L) + picloram (120 g/L)	1 L/60 L diesel	Basal bark/cut stump
	Land—commercial/industrial	Triclopyr (240 g/L) + picloram (120 g/L)	See permit PER10550 (expires 30 June 2013)	
		Triclopyr (300 g/L) + picloram (100 g/L)		
		Triclopyr (300 g/L) + picloram (100 g/L) + aminopyralid (8 g/L)	See permit PER0532 (expires 30 June 2013)	
Forests—timber production	Triclopyr (240 g/L) + picloram (120 g/L)	1 L/60 L diesel	Basal bark/cut stump	

Continued

Pest name	Situation	Herbicide	Rate	Method
Coral cactus	Land—commercial/ industrial/public	Triclopyr (240 g/L) + picloram (120 g/L)	1 L/60 L diesel	Basal bark/cut stump
	Land—rights of way	Triclopyr (300 g/L) + picloram (100 g/L)	See permit PER10550 (expires 30 June 2013)	
		Triclopyr (240 g/L) + picloram (120 g/L)	1 L/60 L diesel	Basal bark/cut stump
		Triclopyr (300 g/L) + picloram (100 g/L) + aminopyralid (8 g/L)	See permit PER0532 (expires 30 June 2013)	
		Triclopyr (300 g/L) + picloram (100 g/L)	See permit PER10550 (expires 30 June 2013)	
	Pastures	Triclopyr (240 g/L) + picloram (120 g/L)	1 L/60 L diesel	Basal bark/cut stump
		Triclopyr (300 g/L) + picloram (100 g/L) + aminopyralid (8 g/L)	See permit PER10532 (expires 30 June 2013)	
Tiger pear	Agricultural land—non- crop	Triclopyr (240 g/L) + picloram (120 g/L)	1 L/60 L diesel	Basal bark/cut stump
		Triclopyr (600 g/L)	3 L/100 L or 0.8 L/60 L diesel	
	Forests—timber production	Triclopyr (240 g/L) + picloram (120 g/L)	1 L/60 L diesel	Basal bark/cut stump
		Triclopyr (600 g/L)	3 L/100 L or 0.8 L/60 L diesel	Basal bark/cut stump
			3 L/100 L or 1 L/75 L diesel	Foliar
	Land—commercial/ industrial/public	Triclopyr (240 g/L) + picloram (120 g/L)	1 L/60 L diesel	Basal bark/cut stump
		Triclopyr (600 g/L)	3 L/100 L or 0.8 L/60 L diesel	Basal bark/cut stump
			3 L/100 L or 1 L/75 L diesel	Foliar
	Land—non-agricultural	Triclopyr (600 g/L)	3 L/100 L or 0.8 L/60 L diesel	Basal bark/cut stump
	Land—rights of way	Triclopyr (240 g/L) + picloram (120 g/L)	1 L/60 L diesel	Basal bark/cut stump
		Triclopyr (600 g/L)	3 L/100 L or 0.8 L/60 L diesel	Basal bark/cut stump
			3 L/100 L or 1 L/75 L diesel	Foliar
	Pastures	Triclopyr (240 g/L) + picloram (120 g/L)	1 L/60 L diesel	Basal bark/cut stump
		Triclopyr (600 g/L)	3 L/100 L or 0.8 L/60 L diesel	Basal bark/cut stump
3 L/100 L or 1 L/75 L diesel			Foliar	
Drooping tree pear	Agricultural land— non-crop	Triclopyr (240 g/L) + picloram (120 g/L)	1 L/60 L diesel	Basal bark/cut stump
		Triclopyr (600 g/L)	0.8 L/60 L diesel	
	Forests—timber production	Triclopyr (240 g/L) + picloram (120 g/L)	1 L/60 L diesel	Basal bark/cut stump
		Triclopyr (300 g/L) + picloram (100 g/L)	0.5 L/100 L	
		Triclopyr (600 g/L)	0.8 L/60 L diesel	Basal bark/cut stump
	1 L/75 L diesel		Foliar	
	Land—around buildings	Amitrole (250 g/L) + ammonium thiocyanate (220 g/L)	1 mL/3 cm (inject) or 1 L/25 L (small plants/regrowth)	
	Land—commercial/ industrial/public	Amitrole (250 g/L) + ammonium thiocyanate (220 g/L)	1 mL/3 cm (inject) or 1 L/25 L (small plants/regrowth)	
		Triclopyr (240 g/L) + picloram (120 g/L)	1 L/60 L diesel	Basal bark/cut stump
		Triclopyr (300 g/L) + picloram (100 g/L)	0.5 L/100 L	
		Triclopyr (600 g/L)	0.8 L/60 L diesel	Basal bark/cut stump
			1 L/75 L diesel	Foliar

Continued

Pest name	Situation	Herbicide	Rate	Method
Drooping tree pear	Land—non-agricultural	Amitrole (250 g/L) + ammonium thiocyanate (220 g/L)	1 mL/3 cm (inject) or 1 L/25 L (small plants/regrowth)	
		Triclopyr (300 g/L) + picloram (100 g/L)	0.5 L/100 L	
		Triclopyr (600 g/L)	0.8 L/60 L diesel	Basal bark/cut stump
	Land—rights of way	Amitrole (250 g/L) + ammonium thiocyanate (220 g/L)	1 mL/3 cm (inject) or 1 L/25 L (small plants/regrowth)	
		Triclopyr (240 g/L) + picloram (120 g/L)	1 L/60 L diesel	Basal bark/cut stump
		Triclopyr (300 g/L) + picloram (100 g/L)	0.5 L/100 L	
		Triclopyr (600 g/L)	0.8 L/60 L diesel 1 L/75 L diesel	Basal bark/cut stump Foliar
	Pastures	Triclopyr (240 g/L) + picloram (120 g/L)	1 L/60 L diesel	Basal bark/cut stump
		Triclopyr (300 g/L) + picloram (100 g/L)	0.5 L/100 L	
		Triclopyr (600 g/L)	0.8 L/60 L diesel 1 L/75 L diesel	Basal bark/cut stump Foliar
Velvety tree pear	Agricultural land—non-crop	Triclopyr (240 g/L) + picloram (120 g/L)	1 L/60 L diesel	Basal bark/cut stump
	Forests—timber production	Triclopyr (240 g/L) + picloram (120 g/L)	1 L/60 L diesel	Basal bark/cut stump
	Land—around buildings	Amitrole (250 g/L) + ammonium thiocyanate (220 g/L)	1 mL/3 cm (inject) or 1 L/25 L (small plants/regrowth)	
Velvety tree pear	Land—commercial/industrial/public	Amitrole (250 g/L) + ammonium thiocyanate (220 g/L)	1 mL/3 cm (inject) or 1 L/25 L (small plants/regrowth)	
		Triclopyr (240 g/L) + picloram (120 g/L)	1 L/60 L diesel	Basal bark/cut stump
	Land—non-agricultural	Amitrole (250 g/L) + ammonium thiocyanate (220 g/L)	1 mL/3 cm (inject) or 1 L/25 L (small plants/regrowth)	
	Land—rights of way	Amitrole (250 g/L) + ammonium thiocyanate (220 g/L)	1 mL/3 cm (inject) or 1 L/25 L (small plants/regrowth)	
		Triclopyr (240 g/L) + picloram (120 g/L)	1 L/60 L diesel	Basal bark/cut stump
Pastures	Triclopyr (240 g/L) + picloram (120 g/L)	1 L/60 L diesel	Basal bark/cut stump	
Spiny pest pear Westwood pear Devil's rope pear Snake cactus	Agricultural land—non-crop Forests—timber production Land—commercial/industrial/public Land—rights of way Pastures	Triclopyr (240 g/L) + picloram (120 g/L)	1 L/60 L diesel	Basal bark/cut stump

Fact sheets are available from Department of Employment, Economic Development and Innovation (DEEDI) service centres and our Customer Service Centre (telephone 13 25 23). Check our website at [www.biosecurity.qld.gov.au](http://www.biosecurity.qld.gov.au) to ensure you have the latest version of this fact sheet. The control methods referred to in this fact sheet 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, DEEDI does not invite reliance upon it, nor accept responsibility for any loss or damage caused by actions based on it.