



# Chinee apple

Indian jujube  
*Ziziphus mauritiana*

**DECLARED CLASS 2**



## Description

Chinee apple (or Indian jujube) is a large shrub or small spreading tree up to 8 m high and 10 m in canopy diameter. The plants are densely branched, from ground level in some cases. Stands of chinee apple grow as open forests, or form thorny thickets along waterways. Branches are zig-zag in shape and have a leaf and a thorn at each angle.

Leaves are rounded, growing on alternating sides of the branches, glossy green above and almost white underneath. Flowers are small and inconspicuous, greenish-white, and emit an unpleasant smell. The edible fruits are similar in size and structure to a cherry, but pale yellow or orange when ripe.

## The problem

Dense infestations create impenetrable thickets which seriously hamper stock management and reduce pasture production and accessibility. Mature trees produce large quantities of fruit that are readily eaten by stock, feral pigs, wallabies and birds, thereby assisting the spread of the seed. Damage to top parts of the plant usually ensures regrowth from lignotubers or cut roots.

## Habitat and distribution

Chinee apple is native to southern Asia and eastern Africa. It was first recorded from the Torres Straits in 1863 and from Townsville in 1916.

The species is widespread in North Queensland, mainly in the areas surrounding towns associated with mining early this century. The largest areas of dense chinee apple are around Charters Towers, Mingela, Ravenswood and Hughenden, but the plant also occurs around many other towns in the drier parts of North and Central Queensland.

Chinee apple is restricted to the drier tropics with an annual rainfall of less than 1–200 mm. It is growing in areas with an annual rainfall as low as 470 mm. During the dry season the plant drops most of its leaves in response to water stress but rapidly produces new leaf with the opening rains of the wet season. Although the species does have a tendency to spread along water courses in the drier regions it is also capable of growing into dense stands on dry, exposed hillsides.

Chinee apple occurs on a wide range of soil types in association with different vegetation groups. It has successfully established on coarse-textured gravelly mullock heaps, deep coarse-textured sands, deep alluvial soils, shallow-surfaced solodic soils and cracking clay soils. The pattern of spread of the plant away from the towns has shown no marked preference for any soil type or vegetation association.

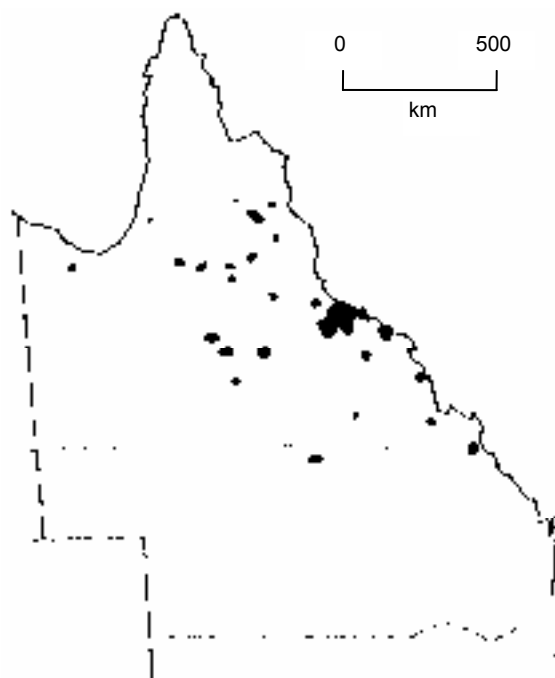
The major factor that appears to affect the growth of chinee apple is the density of the associated vegetation. Chinee apple does not establish successfully under the canopy of other trees and the species is normally restricted to areas that have sparse tree cover or where the other tree vegetation has been removed.

The old mining centres provided ideal conditions for establishment of chinee apple with the complete removal of all trees for pit timber and fuel. Chinee apple is now virtually the only tree species growing for several kilometres around these centres.

## Declaration details

Chinee apple weed is a declared Class 2 plant under *Land Protection (Pest and Stock Route Management) Act 2002*. Declaration requires landholders to control declared pests on the land and waters under their control. A Local Government may serve a notice upon a landholder requiring control of declared pests.

FIGURE 1 – DISTRIBUTION OF CHINEE APPLE



## Control

The spread of weeds threatens the sustainability of agriculture and other land uses. Weeds also devastate native plants and animals.

The best form of weed control is prevention. Always treat weed infestations when small, do not allow weeds to establish. Weed control is not cheap, but it is cheaper now than next year, or the year after. Proper planning ensures you get value for each dollar spent.

Look at your weed problem carefully. Can you realistically eradicate it? Or should you contain the weed to stop new infestations developing while you reduce existing ones? What are you required to do by legislation? How does weed control fit into your property plan? What can you do to restore areas and prevent re-establishment?

Effective control of chinee apple can be achieved by a combination of mechanical and herbicide treatments or by herbicide treatment alone. All areas treated **must be periodically checked** and **any regrowth treated** or the initial treatment efforts will be wasted. **Follow-up must be undertaken** to ensure a successful control program.

### Mechanical control

Dense infestations can be initially cleared by stickraking, ripping or by using a cutterbar (if the terrain and soil type permit). Broken and exposed stems remaining should be treated by basal bark spraying as soon as possible following clearing.

In order to ensure a successful control program, regrowth must be sprayed. Table 1 includes a herbicide registered for the control of regrowth up to 1.2 m high.

Cultivation and the planting of crops or improved pasture will assist in the prevention of reinfestation. Herbicide treatment of regrowth should still be carried out and maintained if the initial program is not to be wasted.

Fire will cause some damage to the plant but regrowth is normally rapid and few plants are killed. Seedlings may be more susceptible to fire but the survival of mature plants will maintain the existing problem.

### Herbicide control

The methods of chemically treating chinee apple are described below. The herbicides registered for these methods are listed in Table 1.

### Basal bark spray

For stems up to 15 cm diameter, carefully spray completely around the base of the plant to a height of 40 cm above ground level. It is most important to thoroughly spray into the crevices of multi-stemmed plants. Larger trees may be controlled by spraying to a greater height, up to 100 cm above ground level. The best time for treatment is during autumn when plants are actively growing and soil moisture is good.

### Cut stump treatment

At any time of year, cut the stems off horizontally as close to the ground as possible and **immediately** (within 15 seconds) swab or spray the cut surfaces and associated stem with the herbicide mixture.

### Soil application – residual herbicide

Apply granules over an area extending from the main stem to 30 cm outside the canopy drip line to cover the main part of the root system. Treated plants will not be affected until sufficient rainfall moves the herbicide into the root zone. **Do not use residual herbicides within a distance of twice the height of desirable trees.**

### Further information

Further information is available from the vegetation management/weed control/environmental staff at your local government.

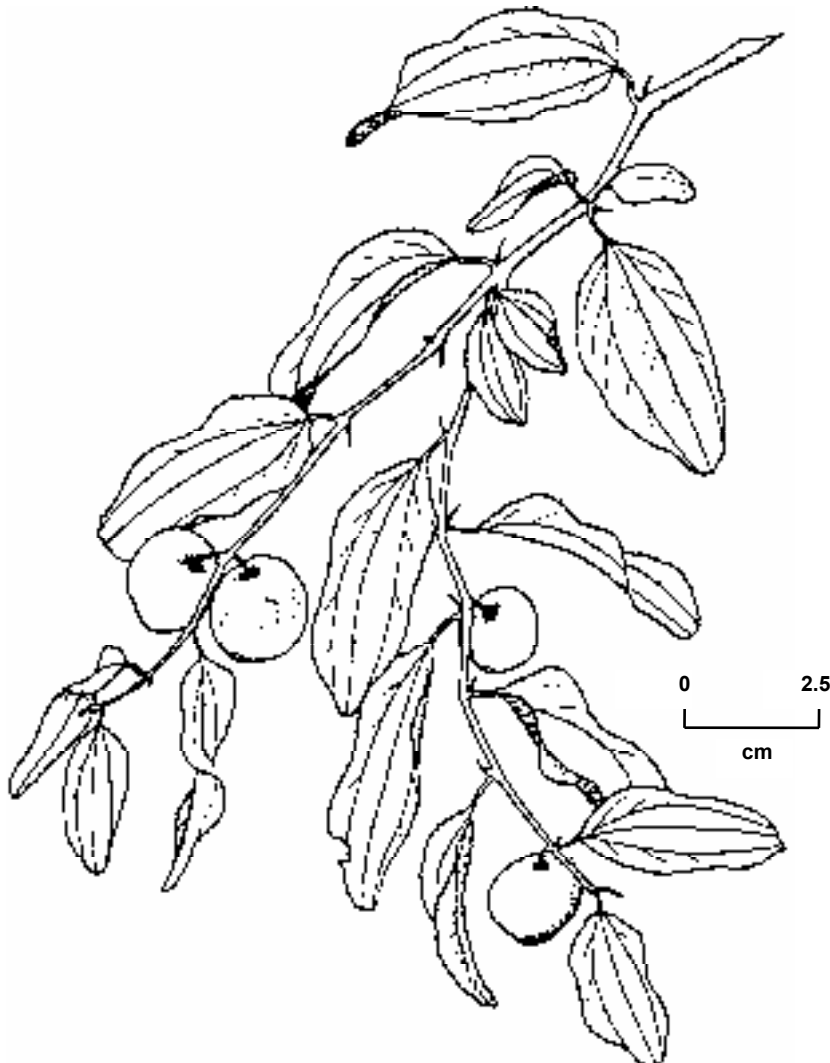


TABLE 1 – HERBICIDES REGISTERED FOR THE CONTROL OF CHINEE APPLE

Application Method	Tradename/ Herbicide	Rate	Optimum stage and time	Remarks
Basal bark/ cut stump	Access®/triclopyr and picloram	1 L/60 L diesel	Basal bark when actively growing. Cut stump any time of year.	Thoroughly spray all crevices. Basal bark spray plants up to 15 cm basal diameter. Cut stump plants greater than 15 cm basal diameter. For cut stump, spray immediately after cutting.
	Starane 200®/fluroxypyr	3 L/100 L diesel		For plants up to 15 cm basal diameter. For cut stump, spray immediately after cutting.
	Tomigan 200EC®/ fluroxypyr	3 L/100 L diesel		
	Garlon 600®/triclopyr	1 L/60 L diesel	Basal bark spray when actively growing. Cut stump any time of year.	Thoroughly spray all crevices. For cut stump, spray immediately after cutting.
	Invader 600®/triclopyr	1 L/60 L diesel		Basal bark suckers and seedlings up to 5 cm basal diameter. Cut stump suckers or seedlings greater than 5 cm basal diameter. Spray immediately after cutting.
	Hurricane 600®/ triclopyr	1 L/60 L diesel		
	Redeem 600®/ triclopyr	1 L/60 L diesel		Basal bark spray plants up to 5 cm basal diameter.
	Triclon®/triclopyr	1 L/60 L diesel		Basal bark spray plants up to 5 cm basal diameter. Cut stump plants greater than 5 cm basal diameter. Spray immediately after cutting.
	Tryclops®/triclopyr	1 L/60 L diesel		
	Safari 600EC®/ triclopyr	1 L/60 L diesel		
Basal bark spray only	AF Rubber Vine Spray®/2,4 - D	1 L/10 L diesel	When actively growing	Basal bark spray plants up to 5 cm basal diameter.
High volume spray	Grazon DS®/triclopyr & picloram	0.35 L/100 L water	Seedling regrowth to 2 m. Spray when plants are actively growing	A wetting agent is recommended to increase efficacy
Soil application – residual herbicide	Tordon® granules/picloram-triethanolamine	35–45 g/m <sup>2</sup>	Apply prior to expected rain	Refer to label for critical comments

Fact sheets are available from NRW service centres and the NRW Information Centre phone (07 3237 1435). Check our web site <[www.nrw.qld.gov.au](http://www.nrw.qld.gov.au)> to ensure you have the latest version of this fact sheet. The control methods referred to in this Pest Fact 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 utilisation 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 of Natural Resources and Water does not invite reliance upon it, nor accept responsibility for any loss or damage caused by actions based on it.