

CELTIS SINENSIS AND ITS CONTROL

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Summary Alternative methods of controlling *Celtis sinensis* Pers. using various treatments and techniques were assessed through a series of experiments performed on three Boonah properties. All non-indigenous woody weeds in blocks of 10 × 50 m were treated, with hundreds of *Celtis* treated per block. Cut stump or preferably basal bark spraying is the favoured selective control of all sizes of *Celtis* in all seasons with 7 g fluroxypyr ester (35 mL Starane 200™) L⁻¹ diesel or 12 g triclopyr ester (20 mL Garlon 600™) L⁻¹ diesel provided the full circumference of each stem is treated from ground level to where multi-stemmed trunks branch.

INTRODUCTION

Celtis sinensis Pers. is an ornamental deciduous tree from China, Korea and Japan which is now naturalized from Monto in Queensland to New South Wales. It continues to be spread by birds and water, establishing along rivers, creeks, fencelines and beyond grazed areas. Scarce irrigation water, moisture for crops and pastures and especially natural bushland is threatened by dense infestations of *Celtis* which range in size from seedlings to trees greater than 10 m tall and 1 m basal diameter. A series of control trials is helping farmers, Landcare groups and bushland rehabilitation projects use selective management strategies to convert infested areas back to natural ecosystems.

MATERIALS AND METHODS

Infestations of *Celtis* covering three locations along Warrill Creek, Boonah were subjected to a variety of control treatments and techniques. Three experiments were conducted, the first in January 1986 (assessed in March 1988), the second in September 1994 (assessed in June 1996) and the third in June 1995 (also assessed in June 1996). All non-indigenous woody weeds in blocks of 10 × 50 m were treated, with hundreds of *Celtis sinensis* treated per block.

The following products were used: Glyphosate 360™ (glyphosate 360 g L⁻¹), Tordon TCH™ (triclopyr amine 100 g L⁻¹ + picloram amine 50 g L⁻¹), neat diesel, Garlon 600™ (triclopyr ester 600 g L⁻¹), Starane 200™ (fluroxypyr ester 200 g L⁻¹), Access™ (triclopyr ester 240 g L⁻¹ + picloram ester 120 g L⁻¹), T-400™ (2,4,5-T ester 400 g L⁻¹), AF Rubbervine spray™ (2,4-D ester 800 g L⁻¹), Grazon DS™ (300 g L⁻¹ triclopyr ester + 100 g L⁻¹ picloram amine).

Table 1. Rates and techniques of herbicide application.

Herbicide	Rate	Technique
Tordon TCH	1:1.5 water	Cut stump/axe
	1:20 water	chainsaw/
	1:10 water	brushcutter
	1:1.5 water	Stem injection
Glyphosate 360	1:2 water	Cut stump/axe/
	1:15 water	chainsaw/
	1:2 water	brushcutter
	1:1 water	Stem injection
	1:2 water	Stem injection
	1:2 water	Rope-wick
	1:15 water	Splatter gun
	1:100 water	Foliar spray
T-400	1:2 water	Cut stump
	1:2 water	Stem injection
Garlon 600	1:200 water	Foliar spray
	1:40 diesel	Basal bark
	1:300 water	Foliar spray
	1:100 diesel	Basal bark
	1:70 diesel	Basal bark
	1:60 diesel	Basal bark
Starane 200	1:50 diesel	Basal bark
	1:40 diesel	Basal bark
	1:30 diesel	Basal bark
	1:20 diesel	Basal bark
	1:10 diesel	Basal bark
	1:60 diesel	Basal bark
Grazon DS	1:200 water	Foliar spray
	1:30 diesel	Basal bark
Access	1:60 diesel	Basal bark
	1:30 diesel	Basal bark
AF Rubber-vine spray	1:80 diesel	Basal bark
	1:40 diesel	Basal bark
Diesel	neat	Basal bark

Methods of herbicide application included cut stump with an axe, chain saw or brushcutter, stem injection, rope-wick application (for trees less than 2 m tall), basal bark spray, foliar spray (for young trees to 2 m) tall and splatter gun for trees to 1 m tall. Also utilized was the manual removal of seedlings (up to 30 cm tall) by hand

Table 2. Summary of the most effective methods of controlling *Celtis sinensis* from techniques tested.

Method	Rate	% kill
Hand pulling	–	100%
Cut stump chainsaw; stacked and burnt	–	100%
Tordon TCH; cut stump brushcutter	1:10 water	100%
Glyphosate 360; wick-wiped	1:2 water	95%
Glyphosate 360; foliar spray	1:100 water	100%
Grazon DS; foliar spray	1:200 water	100%
Garlon 600; foliar spray	1:300 water	100%
Tordon TCH; stem injection	1:1.5 water	95%
Garlon 600; basal bark	1:50 diesel	100%
Starane 200; basal bark	1:30 diesel	100%

pulling. Mechanical and cultural practices involved cutting the tree down, stacking the tops on the stump then burning with hot fire. Each experiment contained a control plot of untreated *Celtis*. Rates of herbicide application specific to the techniques used are listed in Table 1.

RESULTS AND DISCUSSION

The interaction between plant size (basal diameter and height) and the rate/technique of herbicide application affected the level of control achieved. Low rates of herbicide, which proved ineffective on larger trees, produced up to 100 % control of smaller trees. Many methods were effective on *Celtis* with a basal diameter of less than 30 cm. However treatments that did not affect all sizes of *Celtis* were not deemed successful. A summary of the most effective treatments is listed in Table 2.

Celtis sinensis may be effectively controlled by hand pulling small seedlings less than 30 cm high, especially in the wet. Reachable actively growing *Celtis* may be wick-wiped with 1 part glyphosate 360 + 2 parts water. Hot fire associated with an increased fuel load from earlier cut *Celtis* kills remaining ornamentals and allows native regeneration. Trees to 2 m tall can be overall sprayed when leafy with 10 mL glyphosate 360 g L⁻¹ water or 5 mL Grazon DS or 3.3 mL Garlon 600 L⁻¹. *Celtis* taller than 2 m can be stem injected before leaf fall

commences with 1 part Tordon TCH + 1.5 parts water or cut and swabbed with 1 part Tordon TCH to 10 parts water. The cut stump method kills trees with a basal diameter less than 20 cm if applied within 15 cm of ground level and within 15 seconds of bruising sap. Cut stump or preferably basal bark spraying is the preferred selective control of all sizes of *Celtis* in spring, summer, autumn or winter with 0.7 g fluroxypyr (35 mL Starane 200) L⁻¹ diesel, or 12 g triclopyr ester (20 mL Garlon 600) L⁻¹ diesel. So long as the full circumference of each stem

is treated from ground level to where multi-stemmed trunks branch, basal bark treatments give the best control of *Celtis*.

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