CONTROL OF LARGE-LEAVED PRIVET (*LIGUSTRUM LUCIDUM*) AND SMALL-LEAVED PRIVET (*L. SINENSE*) IN URBAN BUSHLAND

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Summary. Two methods of controlling large-leaved privet *(Ligustrum lucidum)* and small-leaved privet *(L. sinense)* were studied: poisoning of standing trees and physical removal. Large-leaved privet regenerated rapidly from cut stumps but not from lateral roots once the stump had been removed. Both species can be killed by injecting concentrated herbicide into the trunk without cutting the tree down. The two methods are discussed in relation to weeding urban bushland so as to cause minimal disturbance.

INTRODUCTION

Large-leaved privet and small-leaved privet are well known on the central coast of New South Wales for their ability to invade disturbed urban bushland and become the dominant species of the small-tree and shrub layers. Once established they increase the amount of shading of the forest floor which gives a competitive disadvantage to the seedlings of the native trees.

In some areas of Sydney which were disturbed about forty years ago there is a well established small-tree stratum of privets and in the wetter areas which have been recently disturbed both species are prominent amongst the suite of invading exotic species. Their control will include both removal from areas of bushland which are already infested and prevention of invasion of new areas, and is complicated by their ability to reshoot from cut stumps and to sucker from roots.

Two experiments were designed to investigate methods of eliminating large plants and of giving native species an opportunity to colonise the resulting empty space.

MATERIALS AND METHODS

The first experiment examined possible methods of killing large individuals of large-leaved privet without the use of chemicals. The treatments applied on June 2 1980 were:

1. Cutting the stem(s) 0.6 m above ground level. This method is sometimes employed by councils and resident action groups.
2. As for 1 but covering the top half of the cut stem with two layers of black plastic.

3. As for 1 but covering all remaining aerial parts of the cut stems with two layers of black plastic.
4. Cutting the stem(s) level with the ground.
5. Removing the main stem after cutting the lateral roots so as not to leave any part of the root in a vertical position, and leaving uncovered.
6. As for 5, but cutting the lateral roots further from the main stem (30-50 cm) and leaving uncovered.
7. As for 5, but propping the ends of the lateral roots into a vertical position and leaving uncovered.
8. In one area most of the privets appeared to be diseased. Six of these individuals were given treatment 1.

Treatment 7 was included to test whether the critical factor controlling shooting from the roots is proximity to the main stem (in which case treatments 5 and 7 should shoot more vigorously than those in treatment 6) or their orientation (in which case plants in treatment 7 should shoot more vigorously than those in treatments 5 and 6). The diseased trees were given treatment 1 to find out if their ability to reshoot had been affected by the disease.

Treatment times per tree were:

Treatment 1 - 1 minute or less
Treatments 2 and 3 - about 10 minutes
Treatment 4 - approximately 2 minutes
Treatments 5, 6 and 7 - 7-10 minutes for medium sized trees and up to 2 hours for large trees with two people taking turns.

The second experiment tested the effect of injecting herbicides recommended for woody plants into mature specimens of the two species of privet. The herbicides and their concentrations in water were: 25% hexazinone[1], 3.6 and 7.2% glyphosate[2], 4.8 and 9.6% triclopyr[3] and 6.6% dicamba[4].

The chemicals were injected using a hypo-hatchet injector[5] set to apply 1 mL per cut and the cuts were spaced at approximately 5 cm intervals around the base of the trunk(s). Treating a tree took from 1 to 5 minutes depending on the ease of access.

All treatments in both experiments were applied to six trees (replicates).

The effect of the treatments was assessed at monthly intervals. In experiment 1 the numbers of trees reshooting and the number and length of the new shoots was recorded. In experiment 2 any changes were recorded that distinguished the treated tree from the surrounding individuals of the same

[1] Trade name Velpar (undiluted).

[2] Trade name Roundup (10 and 20% dilutions).

[3] Trade name Garlon (10 and 20% dilutions).

[4] Trade name Banex (33.3% dilution).

[5] "Inverjector" manufactured by J. Eddy & Sons, Inverell.

species. Leaf loss was scored as minimal, moderate, severe, almost complete or complete. Bark splitting, if it occurred, was scored as minor or severe. Any production of new leaves or shoots after the initial defoliation was recorded.

RESULTS AND DISCUSSION

Table 1. Effect of non-chemical treatments on numbers of large-leaved privets with photosynthesising shoots.

Date	Time after treatment (days)	Number of trees with shoots							
		Treatment Number							
		1	2	3	4	5	6	7	8
July 3 1980	31	-	-	-	-	-	-	-	-
August 7 1980	65	-	-	-	-	-	-	-	-
August 21 1980	79	3	-	-	-	-	1	-	3
September 9 1980	98	3	-	-	1	1	1	-	3
October 9 1980	126	4	-	-	1	-	1	-	3
November 11 1980	158	6	3	-	2	-	2	-	3
December 9 1980	186	6	3	-	4	-	3?[1]	2?	5
January 16 1981	224	6	5	-	5	1?	3?	2?	6
March 11 1981	282	6	5	-	6	-	1	-	6

[1] ? = possible root suckers

Table 2. Effect of four herbicides injected into large-leaved and small-leaved privet.

Herbicide	Small-leaved privet (4 months after treatment)	Large-leaved privet (5 months after treatment)
25% hexazinone	Severe leaf loss and yellowing; 50%[1] reshooting	Severe leaf loss and yellowing 33% reshooting
3.6% glyphosate	Healthy[2]	Healthy
7.2% glyphosate	Variable, from healthy to complete leaf loss	Variable, from healthy to severe leaf loss
6.6% dicamba	17% dead, 50% healthy, 50% reshooting	Variable, from healthy to complete leaf loss
4.8% triclopyr	Severe leaf loss and bark splitting; 33% reshooting	Severe to complete leaf loss, severe bark splitting
9.6% triclopyr	Severe leaf loss and bark splitting; 66% reshooting	Same as 4.8% triclopyr but uniformly more severe

[1] % = percentage of trees in this treatment

[2] healthy = trees fully recovered from any effects of the treatment

The results from the first experiment illustrate the ineffectiveness of cutting privet trees down and leaving the stumps in the ground without taking steps to control reshooting. Those trees which were covered with black plastic developed chlorotic shoots beneath it but as yet, March 11 1981, they have not broken through. This method of controlling suckering may be successful but it is still too early for a definite conclusion.

The injection of herbicides into standing privets caused much less disturbance to both the soil and the surrounding plants than any of the treatments which involved felling. It was also much quicker and required less labour but there is a possibility of residual effects if large numbers of trees were treated in the one area.

The most effective of the six treatments, the two concentrations of triclopyr, appear to have completely killed the above ground portions of the large-leaved privets. The small-leaved privets exhibit the same symptoms of defoliation and splitting of the bark but as they are reshooting from the trunk they may require follow-up treatments.

Of the other chemicals tested, hexazinone has had the most consistent effect on both species. Glyphosate has a considerable advantage in being rapidly inactivated in the soil but the concentrations used gave variable results. It is intended to repeat the experiment using triclopyr and to test higher concentrations of glyphosate.

At present, the Bradley method of weeding bushland with minimal disturbance (Bradley 1971), does not include the use of herbicides. However, it is difficult to apply the Bradley method of hand weeding to large trees (from 15 to 40 cm diameters) with extensive root systems. Felling such trees, with or without herbicide treatment to the stumps is undesirable because of the gross disturbance to the surrounding area. The careful use of herbicides may therefore have a place in privet control when applied to standing trees. Fungal decay will remove the dead plants more gradually than felling and with minimal disturbance. Judicious use of herbicides may also be of value for controlling the spread of other large woody plants which can invade bushland, such as camphor laurel *(Cinnamomum camphora)*.

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LITERATURE CITED

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