CONTROL OF WOOLLY NIGHTSHADE BY RING-BARKING

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Summary

Ring-barking of woolly nightshade (*Solanum mauritianum*) can replace herbicides for control of small areas of this weed tree. A tree-planting spade is used to remove a ring of bark from a height of about 20 cm down to ground level. It should be done in summer for best results. After 6 months, surviving trees should be inspected to remove any healing callus growing across the wound, or any sprouts formed at the base of the tree.

INTRODUCTION

Woolly nightshade is a small tree which, in Northland, is commonly called tobacco weed. It is a garden escape which has remarkable vigour and has become well established (Healy 1974). Control can be obtained by various herbicide applications (Matthews 1975).

However, at times it may be necessary to destroy the weed without herbicides because of the risk from indiscriminate spraying; or because basal applications may not be convenient. Plants up to 2 m tall may be pulled or dug out, under moist soil conditions. Cutting down the tree is undesirable because the plant normally sprouts freely from the stump, becoming a more difficult target to destroy than the original single-stemmed plant. Also the debris provides protective shelter for seedlings and causes obstruction. Ring-barking offers a solution, though some trees survive either by growing a strip of callus across the wound, "bridging", or by sprouting below it.

To find out if there is a seasonal variation in the capacity of woolly nightshade to recover from ring-barking a preliminary trial was carried out in 1975 in which a total of about 400 trees were ring-barked. Treatments were at intervals of 2 weeks from May to November. The period from autumn to spring was chosen on the assumption that wounding over this period, at a time of lowered food reserves, might achieve best results.

The trial could not be completed because part of the experimental area was destroyed. However, it was found that a tapered spade was the most effective tool for ring-barking and that the ring-bark must be made down to soil level to minimise basal sprouts which can form in winter.

METHOD

A farmer near Kerikeri, with large numbers of woolly nightshade growing in stony ground in a valley, kindly undertook to provide an area and to keep it free from stock. Bark on many of the trees had been eaten by cattle during the previous dry summer, but the trees had survived the damage and carried normal foliage.

An "Atlas" tree-planting spade was chosen as the ring-barking tool. It has a strong, ridged blade, 29 cm long, tapering from 19 cm wide at the top to 12.5 cm at the base. The blade is sharpened on three sides and treaded at the top. The shaft is steel, the handle plastic, and the weight is 2.5 kg. This tool can also be used as a slasher to clear undergrowth. If the worker stands close to the tree the spade can be driven downwards in successive strokes around the trunk to strip off bark to ground level. If topography, or the attitude of the tree, dictates working at a distance the sloping sharpened edges of the spade can be used to slash off the bark. The ring-bark cuts were made about 15 cm wide. Under easy conditions a steady worker can ring-bark 30-40 trees an hour.

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Starting in mid-May 1979, a series of trees were ring-barked each month for 12 months. Over the year a total of about 900 trees were ring-barked, averaging about 70 a month (range 42-122). In May 1980 the diameter of the wood at the ring-bark of each tree was measured. The presence, absence or condition of leaves, basal sprouts, and any bridging of the ring-bark was noted.

If a tree had not bridged the ring-bark, if all leaves had been shed and if no basal sprouts had grown it was recorded as "dead". This diagnosis was usually physiologically premature because much of the bark tissue above the wound can remain green for a year or more. The tree may even retain some leaves and form flowers, yet eventually succumb. Such trees, when without any basal sprouts within 3-4 months of ring-barking, were recorded as "dying".

A tree with a healthy bridge, carrying normal foliage, was recorded as "bridged". Such a tree usually recovers completely. Presence of basal sprouts suggests survival. But they may die for various reasons, possibly due to pathogenic organisms attacking the wound, especially if it is close to ground level. Thus an apparent failure due to sprouting can later change to a successful kill. Some trees were "bridged" and had basal sprouts.

RESULTS

The treated trees were grouped into three sizes according to the diameter of the wood of the ring-bark. Trees with a diameter of less than 2 cm were dug or pulled out. The groups were: small, 2-5 cm diam; medium, 6-10 cm diam; large ►11 cm diam.

Data for the ring-bark treatments in March and April 1980 were not included because, though the trees were showing severe symptoms, it was considered too early to assess whether bridging would eventually take place. Thus this report is confined to the monthly treatments from May 1979 to February 1980 inclusive, recorded on 6 May 1980.

The results are tabulated in Table 1 according to plant size; and the combined results graphed in Fig. 1.

DISCUSSION AND CONCLUSIONS

Another 6-12 months would be required to establish conclusively the proportion of treated plants that will recover.

TABLE 1: Effects of ring-barking on woolly nightshade, of different sizes, at different times of the year. Data recorded 6.5.80.

Month	Small 2-5 cm				Medium 6-10 cm				Large ►11 cm			
	% of Total				% of Total				% of Total			
	D	B	S		D	B	S		D	B	S	
1979												
M	23	48	44	31	19	22	48	35	6	83	17	17
J	32	50	31	34	14	57	36	14	13	54	23	38
J	17	30	47	30	16	31	56	25	9	22	78	22
A	50	65	22	14	25	48	48	4	6	50	50	17
S	35	63	23	26	18	62	28	22	12	25	50	50
O	37	48	19	32	25	40	28	40	11	54	27	36
N	57	65	30	5	15	73	20	13	9	66	33	0
D	37	62	30	8	26	80	15	4	1	100	0	0
1980												
J	55	80	16	4	29	82	14	3	4	75	25	0
F	86	86	14	0	28	75	21	4	8	50	50	0

T = Total of plants; D = Dead or dying; B = Bridged; S = Basal sprouts

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The main cause for failure is bridging, which occurs less frequently in summer. Even a careful worker may leave filaments of cambium on the wound which, under damp conditions, can multiply and form a protective covering, leading to re-establishment of conducting tissue.

Fig. 1 Effects of ring-barking on woolly nightshade shown as averaged percentage of all plants treated in successive months. Recorded 6.5.80.

D = Dead and dying; B = Bridged; S = Basal shoots

In summer, desiccation may destroy this zone before it has time to establish. Of course, the wider the ring-bark the less the chance of bridging. The summer of this trial was exceptionally wet, which may have favoured bridging.

The results also show that basal sprouts appear to be more numerous during periods of vigorous growth in autumn and spring.

It may be concluded that ring-barking offers a practical method of attacking small areas of woolly nightshade, especially if single-stemmed. The trees should be ring-barked from at least 20 cm above the ground down to and, if possible, beneath ground level. A sharpened tree-planting spade is suitable. Care must be taken to remove all cambium tissue. The work is best done from mid-November to mid-February; mid-winter being least successful.

Follow-up inspection of the trees should be made about 6 months after treatment, when any sprouts or bridging can be destroyed.

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