

Effect of Bark Removal Above and Below Wounds in Red Maple on Bark Dieback and Discolored Wood Columns

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ABSTRACT

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Horizontal saw kerf wounds were made in stems of pole-sized red maples in the spring and autumn. A test wound (bark removed above and below the kerf in a biconvex lens pattern) and a control wound (corresponding bark left intact) were made on each tree. After two growing seasons, trees were dissected for observations of bark dieback and wood discoloration above and below wounds. Bark dieback was less around wounds made in the spring than around those made in the autumn. Discolored wood columns were shorter when wounds were made during a period of vigorous tree growth in the spring than when they were made early in the spring or in the autumn. Removal of bark increased the length of discolored columns regardless of the time of wounding.

Additional keywords: tree decay, tree wound healing, tree wound occlusion, wood stain

From time to time, those concerned with the care of tree wounds have advocated the removal of bark above and below wounds to produce a lens pattern (Fig. 1B). This practice probably resulted from the observation that this bark often dies naturally, so it seemed reasonable to remove it as soon as possible in the interest of appearance and health. Our recent work, however, suggests that if wounds are made in the spring, bark removal may be harmful, because natural bark death around wounds made at that time is limited, and the removed bark might not have died.

The present study examined the effects of intentionally removing bark next to wounds on subsequent bark dieback and on the length of discolored columns of wood associated with the wounds. The size of discolored columns is of particular consequence because decay occurs only in discolored wood. As in the previous work (2), tests were made in the spring and autumn.

MATERIALS AND METHODS

Pole-sized stands of red maples (*Acer rubrum* L.) with a stem diameter of 15–25 cm at breast height were used. Two wounds were made with a chain saw on each tree. Each was a single horizontal kerf 1 cm high, 10–16 cm wide, and 4–6 cm deep. Wounds were made 1–2 m

above the soil, at different elevations, and faced east and west. The control wound received no further treatment (Fig. 1A). Pieces of bark above and below the kerf of the other wound, the test wound, were removed to produce a biconvex lens pattern (Fig. 1B). The points of the lens were 10 cm from the edges of the kerf. The directions that control and test wounds faced were alternated in successive trees to balance environmental conditions for each wound type.

Spring wounds were made at three dates in March and April 1985, and data were taken in the autumn of 1986. Autumn wounds were made on four dates between 2 and 16 October 1985, and the data were taken in the autumn of 1987. Thus, trees were evaluated two growing seasons after wounding.

The extent of bark dieback and the length of the discolored columns in wood within the tree above and below a kerf were measured on a radial face exposed by cutting, with a chain saw, longitudinally through the center of the wound kerf (and through points of test wounds) and up and down the stem (Fig. 1C). Because the previous study (2) had shown that measurements of bark dieback above and below kerf wounds were more useful than measurements at the sides of wounds, dieback was measured only above and below wounds.

RESULTS

Discolored columns of wood were longer when the bark had been removed than when it was left intact (Table 1). Removal of the bark for 10 cm above or below a wound increased the length of the discolored wood column within the tree by about 10 cm. Also, removing bark was harmful, particularly in the spring, because natural bark dieback was

less than the amount of bark that was removed (Table 1).

Bark dieback was least and discolored columns in wood were shortest after wounding in spring when trees were growing vigorously, compared to autumn wounding (Table 1, April and October dates). Thus, these results support those of previous work (2). As in those studies, the extent of bark dieback and the length of discolored columns in wood did not differ significantly above-versus below wounds. When wounds were made in the early spring before flower buds had expanded (Table 1, March date), the resulting discolored columns were longer than those in trees wounded later in the spring or in autumn.

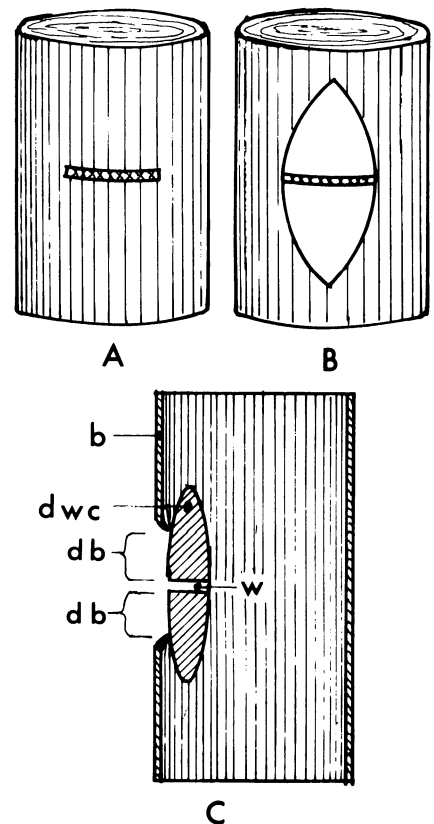


Fig. 1. (A) Control wound (hatching) made with a chain saw. (B) Test wound, with sections of bark 10 cm above and below the wound removed to form a biconvex lens pattern. (C) A section through a control wound two growing seasons after wounding, showing bark (b), wound (w), bark dieback above and below wound (db), and discolored wood column (dwc). Figure is not drawn to scale.

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Table 1. Effect of bark removal above and below wounds in red maple stems on bark dieback and length of internal columns of discolored wood

Season of wounding	Date	Ontogeny	Number of trees	Control wounds (no bark removed)		Test wounds (10 cm of bark removed)	
				Bark dieback above or below wound ^{x,y} (cm)	Discolored wood above or below wound ^{x,y} (cm)	Bark dieback above or below removed bark ^{x,y} (cm)	Discolored wood above or below wound ^{x,y} (cm)
Spring	21 March 1985	Buds not opened	20	1.9 b	20.8 a	0.9 b	36.8 a
	4 April 1985	Flowering beginning	13	1.8 b	10.2 c	0.2 b	17.2 c
	12 April 1985	Flowering half over	10	1.2 b	5.6 d	0.2 b	14.0 c
Autumn	October 1985 (four dates) ^z	Leaves falling	51	7.0 a	16.5 b	6.0 a	26.5 b

^xThere were no significant differences ($P = 0.05$) above or below wounds, so data were combined for Duncan's new multiple range tests.

^yColumn mean figures followed by the same letter are not significantly different ($P = 0.05$).

^zThere were no significant differences ($P = 0.05$) among tests on different dates, so data were combined.

DISCUSSION

This work shows that removing bark around deep wounds on maples is undesirable. Bark removal may increase the amount of discolored wood that is subject to decay and may lengthen the time required for complete wound occlusion.

If it is necessary to make wounds on maples, they are best made in the spring when trees are growing vigorously. Wounding at that time results in the least bark dieback and the least amount of discolored wood, responses that were positively correlated in this study, as in the previous one (2). Wounding in the early spring before buds swell caused more discolored wood in this study than wounding at other times. Further work

is needed on early spring wounds, but it now appears that wounding of red maple is least harmful if it occurs after most flowers have opened. How long this favorable period extends depends on moisture and other variables (2), but it probably lasts from flowering until the youngest leaves are nearly fully expanded.

Although this account is based on but one series of experiments, it confirms and extends earlier work with red maple. Studies such as this have aesthetic and practical implications for tree care and should be extended to other tree species, particularly if the current theory about the role of water pressure in the tree (1-3) can be applied generally. According to this hypothesis, the fewest defects would be expected following wounding in

spring, when sapwood is maximally hydrated.

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