

MOHONK PRESERVE, INC.

Research Report

November, 1987

Living Stumps of Hemlocks (*Tsuga canadensis* (L.) Carr.)

by

Paul Huth

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Living Stumps of Hemlocks (*Tsuga canadensis* (L.) Carr.)

This overgrowth condition was first described in literature by F. H. Lamb in 1899 (Botanical Gazette 28:69). The phenomenon occurs when the top portion of a tree is cut (many times from thinning of nearly pure stands, ex. plantations), and the stump in subsequent years is "healed" over by living bark. This has been noted in other conifer species such as Grant Fir, White Fir, Big Tree, Douglas Fir, Western Yellow Pine, and White Pine. In the Shawangunks, only Hemlock has been observed with living stumps. No White Pine examples have been noted. No new sprouting from adventitious buds occurs from the surface or base of the cut stump. Generally the average rate of growth of this "healing" wood is considerably less than the average annual expansion of the tree before it was cut, or in surrounding trees.

The reason for this continued stump growth after trees have been cut is directly attributable to naturally occurring root grafts. Professor Frederick S. Page (Dartmouth) reported in the Journal of Forestry 25:687-690, 1927, that generally healed over Hemlock stumps are hollow, while White Pine stumps remain solid. He found that "root grafts were not difficult to find on larger stumps. In one instance there were nine of them between the roots on one side of a living pine stump and a tree of the same species standing 91cm distant. The youngest pair of grafted roots observed were ten and thirteen years old, respectively, when the union took place, and the age of the one tree cut was about eighteen years. Probably root grafting does not take place until the roots are large enough so that considerable pressure is exerted when they grow in contact."

In the Shawangunks, the first record of live bark on Hemlock stumps was in March 1974, in a grove of hemlocks on a northwest facing slope, on the north side of Mountain Rest Road on the G. M. Ayers lot (Appendix 1-a & b). Then Dan Smiley noted five stumps with some live bark. Cutting had occurred some 30-40 years earlier. He found four living trees within 2.5m. An inspection in October 1986 of this same stand showed 11 stumps from 3 to 12 inches in diameter with live bark. Extensive decay was noted in some of the old wood of the stumps.

Four other observations of live bark on Hemlock stumps have been made by Dan Smiley in recent years. In March 1979, a 5-inch diameter stump east of Mossy Brook Spring was found. Again much decay of the old wood was noted. In Rhododendron Swamp in January 1980 one "well grown over" stump was found; the center hollow. Although all "healing" seems to be found on cut stumps, this one could not be determined to have been cut or naturally broken. In March 1985 at the beginning of Rock Rift Path an old cut stump was found with bark grown over the sapwood, the adjacent heartwood rotted away. Dan suggested a root connection to two adjacent live trees. The most recent examples were found in October 1986. These are near Open Camp - two cut stumps about 3 feet apart, with a root from a live tree toward one of them.

None of the Shawangunk examples noted above were excavated to explore the locations of root grafts. Drilling of the living wood with an increment borer has been suggested as a means of possibly determining the date of cutting and years of growth of the live wood. However, as Professor Page points out, "the line of demarcation between the two periods of growth is usually not distinct." As part of further observation drilling will be attempted on selected Shawangunk living stumps.

Donald W. Davidson, Dept. of Botany, Rutgers, has observed living stumps of Hemlock in northern New Jersey (Torreya Vol. 90(2): 204-207 (1963); Torreya Vol. 91 (3): 233-234 (1964). In all stands, Hemlock was the dominant canopy species. He reports 118 "living stumps," 15 "stump fragments," and five tree trunks without limbs or foliage. Davidson feels that the sizable number "suggests that this is by no means an uncommon phenomenon in this area."

It is hoped that by documenting these living stumps it stimulates others to report their observations to the Research Center.

Paul Huth

Hemlocks - Live Bark on Stumps

28 Mar. '74

On G.M. Ayers^{#126} (or F. Terwilliger, #131) lot
75 m. N. of High Falls Road and 10 m.
east of stream on NW slope.

of 7 stumps from cutting of 30 to 40
years ago:

5 had some degree of ^{live} bark
on sides of stump and grown
over part of cut surface,
for distance of 1 to 1 $\frac{3}{4}$ inches.
one stump 9 in. diam, 9 in. high
with slope cut had live bark.

2 not grown over

1 "knee" 3" x 3" (like cypress)

there were four live trees within
 $\frac{1}{2}$ to $2\frac{1}{2}$ m., whose d b h was
4 in., 10 in., 16 in., and 15 in.

D.S.

Appendix 1b. 28 Oct. 1986

We drove to the area of the brook crossing Mountain Rest-High Falls Road, about 300 ft. west of the 27 Knolls Road junction. To the north of the road is a fine grove of Hemlocks on the northwest facing slope (G.M. Ayers lot). Here Dan had noted live bark on cut stumps in March 1974 (see file 41.1).

Among the Hemlock trees several large American Chestnut stumps were in good condition. They had been cut and had not generated sprouts. Some of the Hemlock trees we estimated to be 80 ft. tall. The blue-marked trail passes through the grove. We found 11 stumps from 3 - 12 in. (+/-) with live bark. A pileated woodpecker was heard.