ROOTING JUVENILE STUMP SPROUTS OF SHORTLEAF AND PITCH PINE

John E. Kuser[1]

Abstract.--Cuttings of juvenile-leaved stump sprouts of shortleaf and pitch pine were taken from burned areas in southern New Jersey during the summer of 1985, treated with rooting hormones and stuck in peat/vermiculite under mist and light saran. By the end of October, approximately half of them (varying with hormone treatment) had rooted.

Additional keywords: *Pinus echinata,* P. *rigida,* vegetative propagation, juvenility.

INTRODUCTION

While it is generally recognized that cuttings of most pine species are difficult to root, stump sprouts may be an exception. Unlike most conifers, pitch pine, *Pinus rigida* Mill., and shortleaf pine, P. *echinata* Mill., sprout from the stump after logging or fire. In the New Jersey pinelands, sprouts of both species initially bear primary leaves rather than fascicled needles. Because juvenility is an important key to rooting success with many species, and primary leaves in pines are a morphological marker of juvenility, I wondered whether these sprouts would root easily.

MATERIALS AND METHODS

I took shortleaf stump sprout cuttings on July 17, 1985, in an area around the New Lisbon experiment station where young shortleaf had been control-burned the previous winter. Most of the sprouts bore only primary leaves, but some were beginning to grow fascicles of needles in the leaf axils. I clipped them with a knife as close as possible to the base, taking a heel with some, put them in a plastic bag over ice, brought them to New Brunswick and later the same day dipped the lower 2 cm of some in Hormodin 2, some in Hormodin 3 with Benlate (19:1), and some in Rootone F. As trying to remove the lower leaves damaged the soft stems, I left the leaves on. I stuck them in a peat-vermiculite mixture in trays, and put half the trays in our regular propagating room under mist (5 sec ev 60 sec) and light saran, and half the trays in an evaporation-cooled bed under mist (30 sec ev 7 1/2 min.) and light saran. The temperature in the propagating room was not controlled, and on bright days it rose as high as 39° C.; the temperature in the evaporation-cooled bed did not exceed 28° C.

[1]Associate Professor of Forestry, Dept. of Horticulture & Forestry, Cook College, Rutgers University and New Jersey Agricultural Experiment Station New Brunswick, NJ 08903. NJAES Publication No. R-12388-2-86.

On August 9, I took pitch pine cuttings at a small burn site one mile north of the New Lisbon station. The donor trees were of mixed ages. Seedlings and saplings had been killed to the ground and were stump-sprouting; larger trees up to 6" (15 cm) dbh had had their foliage scorched up to 10' - 15' (3m - 4.5m) above the ground and were producing juvenile sprouts from trunks and larger branches. At this time, about half the sprouts bore needle fascicles in the leaf axils. I performed the cutting and sticking procedure exactly as with shortleaf.

RESULTS

The usual evidence of rooting was a swelling of the terminal bud, indicating that a new flush of growth was about to begin. This occurred on the first pitch pine cutting three weeks after sticking in the bed in the propagation room, and continued sporadically, a few each week in this bed with both species until October 10. By the end of October, many cuttings had rooted in the bed in the propagation room (Table 1), but no cuttings in the cooled bed had rooted.

Table 1. Number of Shortleaf and Pitch Pine Stump Sprouts Rooted.

Shortleaf Pine	
Hormodin 3/Benlate	6 of 15
Hormodin 2	10 of 15
Rootone F	28 of 60
Pitch Pine	
Hormodin 3/Benlate	9 of 15
Hormodin 2	0 of 15
Rootone F	5 of 15

Small (5-10 cm) juvenile-leaved cuttings rooted better than larger cuttings which had begun to bear fascicled needles. Taking a "heel" with the cutting made no difference.

DISCUSSION

Six rooted cuttings of each species are being grown on to show whether they will grow as fast and orthotropically as seedlings of similar age, and whether their juvenility will persist, enabling them to grow like seedlings rather than like rooted cuttings from upper crown of older trees (Greenwood 1984). Five of the pitch pines are growing normally this year, with fascicled needles elongating along with the new shoots and primary leaves reduced to scales; however, one has produced a primary—leaved shoot at the top alongside a needled shoot. All the shortleafs grew primary leaves on terminals in the first flush, but are now growing fascicled needles in the second flush. All 12 rooted cuttings are growing orthotropically so far; the shortleafs appear juvenile in their degree of branching.

Our success in rooting pitch pine stump sprouts parallels that of Santamour (1965), who took cuttings on September 29 from stump sprouts of a 29-year-old tree and rooted 66% of them by the end of the following January. Ours were taken seven weeks earlier, while more succulent and presumably before more fascicled needles were present. We are currently seeking to determine whether there is an optimum date for taking cuttings, and whether rooting success can be raised to 75% or 90%.

Shortleaf pine stump sprouts from three- or four-year old trees were rooted by Bormann in 1954 without any rooting hormone (those he treated with hormone did not root). Ours behaved differently, with their rooting performance being relatively unaffected by hormone type (as compared with pitch pine); for this reason, we judged them easier to root than comparable pitch pine sprouts. They retain morphological juvenility longer, with many going through the first winter bearing only juvenile leaves while nearly all pitch sprouts grow fascicled needles in August and September. Our results indicate a possible alternate way to propagate shortleaf pine clones for seed orchards in case of graft incompatibility.

There may be two reasons why the cuttings in the cooled bed did not root; temperature, and too much wetness. Greenwood et al (1980) have pointed out the importance of mist level in rooting morphologically mature pine shoots, indicating that too much moisture deposit is as bad as too little. Cuttings in our cooled bed were always dripping wet, and they were covered with algae by October, while there were no algae on cuttings in the hot propagating room.

Neither pitch nor shortleaf pine are as important commercially as loblolly, slash, and longleaf pine. But if we can develop an easy way to root proven genotypes of the stump-sprouting species, trees old enough to have demonstrated their worth, we may find a way later to transfer the technology to commercial species. Loblolly pine is closely related to pitch pine, as we know from Dr. Little's work, and if we could induce half-rotation-age loblolly to produce juvenile sprouts which root easily, this would be a useful step forward.

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