Air Rooting of Peach Semihardwood Cuttings

D.C. Coston¹, G.W. Krewer², R.C. Owings², and E.G. Denny²
Department of Horticulture, Clemson University, Clemson, SC 29631

Abstract. Semihardwood peach [Prunus persica (L.) Batsch] cuttings were successfully rooted when the bases and tops were misted intermittently with water. Rooting was not affected by cultivar or type of cutting (basal vs. terminal). Closer proximity of the bases of the cuttings to the mist line and overhead misting improved rooting percentage.

High-density production of peaches results in high yields early in the orchard’s life, potential for mechanization, and potential reduction in hand labor (2, 4, 5). For these systems to become commercially feasible, inexpensive propagation methods for large numbers of plants are essential. Budded nursery trees are planted in traditional peach orchards but are too expensive for high-density systems. A potentially valuable approach is to use rooted cuttings of scion cultivars.

Several researchers have demonstrated peach propagation using hardwood cuttings (7, 8, 9, 13). More recent reports indicate the potential for using hardwood cuttings in the meadow-orchard system (4, 5, 6) and for the Tatura trellis system (2). Robitaille and Yu (12) propagated ‘Redhaven’ peach using sprouted nodal cuttings early in the growing season. Couvillon and Erez (3) propagated several cultivars using semihardwood cuttings taken in late summer.

In the present work, experiments are described in which peach cuttings were rooted in air while misting the tops and bases. The concept of rooting in air is not new, but has never been reported for peach cuttings (1, 10, 11).

In the initial experiment we used a 30.5-cm Plexiglas cube (6-sided with drainage hole in the base) painted black to exclude light. A deflective mist nozzle was mounted in the base and another above the cube. ‘Redhaven’ peach cuttings (25 cm long) taken August 7–10 were wounded by removing bark on 2 sides from the lowest 4–5 cm, dipped in 2500 ppm indolebutyric acid (IBA) in 50% ethanol for 5 sec, and inserted through one-cm holes drilled in the top of the box. Paper clips placed 10 cm below the apex of the cuttings kept the bases suspended within the box. Mist was applied for 5 sec each 2.5 min during daylight hours. In the initial test using the Plexiglas box, 73 of 75 apical cuttings rooted within 3 weeks. On many cuttings, roots were evident within 7 days. Encouraging results from this experiment led to construction of a larger chamber for air rooting.

A sheet of 2.5-cm-thick Styrofoam was suspended 90 cm above the greenhouse floor. Black polyethylene was draped from the edges of the Styrofoam to the floor and the top was covered with aluminum foil to reduce light to the rooting zone. A mist line using deflective nozzles 77 cm apart was placed 40 cm above the greenhouse floor and another placed 30 cm above the Styrofoam. Mist was applied above and below the cuttings for 5 sec each 2.5 minutes. A total of 1850 semihardwood cuttings of several cultivars were taken in mid-September and treated as described above. Cuttings were 35–50 cm in length and were inserted through the Styrofoam, leaving 10 cm outside the box. The design was a randomized complete block with 4 replications.

Tests were conducted using the larger system to evaluate influence of position in the box, type of cutting (basal or terminal), cultivar, and absence of overhead mist on rooting. Interactions among factors were not significant; thus, only main effects are presented. Cuttings were inserted September 18–22, callus was observed in early October, and roots were emerging October 8. Percent rooting, percent callused, and percent dead cuttings were determined in late October (Fig. 1).

Cuttings near the center of the box rooted better than those at the edge (75% vs. 45%). The outer 10 cm on each side of the 1.25-m wide Styrofoam sheet were considered ‘edge’, with the remainder of the width considered ‘center’. Of the edge cuttings which did not root, 40% callused. The cuttings in the center received more mist from the line, which ran lengthwise in the center of the chamber. Using 2 mist lines beneath the cuttings or a narrower box should result in more even distribution of water and higher percentage rooted.

Type of cutting (basal or terminal) did not influence rooting. Thus, using the entire current season’s growth to provide several cuttings is feasible.

No differences in rooting were found among the 3 cultivars used in this experiment. Rooting percentages were lower in these tests with the large air-rooting chamber than with the Plexiglas box. This was expected since optimum time for propagation of semihardwood cuttings in vermiculite in Georgia (3) and South Carolina (unpublished data) is early August. The initial test was conducted in August and the latter ones in late September through early October.

‘Redhaven’ cuttings receiving bottom mist only did not root as well as those receiving mist both underneath and above (27% vs. 65%). The best rooting of cuttings receiving bottom mist only occurred in the center of the chamber adjacent to the mist line (48%).

Received for publication August 20, 1982. Technical Contribution No. 2068 of the South Carolina Agricultural Experiment Station, Clemson. This research was supported by grant funds from the United States–Israel Binational Agricultural Research and Development Fund (Grant No. 1-198-80). The cost of publishing this paper was defrayed in part by the payment of page charges. Under postal regulations, this paper therefore must be hereby marked advertisement solely to indicate this fact.

¹Associate Professor.
²Graduate Student.
To achieve good rooting with this system, misting the tops as well as the bases of cuttings is necessary.

Cuttings, rooted with this system, were held in a cooler (7°C) during winter and were planted in a meadow orchard in early March. Survival was 90% and trees were 1.2 to 2.0 m tall after one growing season.

Some of the cuttings in this experiment were left in the chamber several weeks after rooting and Fusarium killed the roots. Rooted cuttings should be removed after 3 to 4 weeks and held in a cooler or, if soils are warm, transplanted to the orchard site. Subsequent tests with air-rooted peach cuttings suggest that 50% to 75% will survive winter if planted by October 1 in South Carolina.

Air rooting provides a method for propagating semihardwood cuttings of peach scion cultivars without a solid medium. Observation of rooting progress is possible without disturbing the cuttings. Another potential advantage is the possibility of applying supplemental hormones or nutrients to the developing roots through the bottom mist line. Optimum rooting can be expected by taking cuttings in early August, assuring good coverage of the bases of the cuttings with mist, and using overhead mist also.

Preliminary tests with several other plants (rabbiteye blueberry, hybrid rhododendron, wild deciduous azalea, crepe myrtle, and Juniper) indicate satisfactory rooting of cuttings taken in mid-September and processed similarly as the peach cuttings described here.

**Literature Cited**


---

**Factors Affecting Survival of “In Field”, Rooted Hardwood Peach Cuttings**

Seyit Mehmet Sen1 and G.A. Couvillon2
Department of Horticulture, University of Georgia, Athens, GA 30602

Additional index words. meadow orchard, Prunus persica

**Abstract.** Unrooted hardwood cuttings of ‘Harvester’, ‘Redhaven’, and ‘Bicentennial’ peach [Prunus persica (L.) Batsch] were planted directly in the field. Survival decreased with planting dates from November to January. Basal wounding increased survival of all cultivars. Survival of cultivars varied significantly.

High-density peach plantings require inexpensive plant material for orchard establishment. This is especially true for annual or biennial (2, 4) peach production systems that would allow for the rotation of peaches with other crops. Although inexpensive peach trees can be propagated from semihardwood cuttings (1, 3), propagation by hardwood cuttings would be most simple and least costly of all propagation methods. Although hardwood peach cuttings have been rooted (5, 6, 7, 8, 9, 11), in most cases the cuttings were press-wounded or rooted in some type of propagation structure before planting in the field. An appealing method would be to root peach hardwood cuttings “in place” in the orchard where they are to be grown before the onset of low winter temperatures. This has been done with limited success (22% to 42% rooting) in the coastal plain of Israel (5), where soil temperatures are moderately high (12°C or greater) throughout most of the winter. Moderate soil temperatures are required for successful rooting of peach hardwood cuttings (5, 8, 9). Erez and Yablowitz (5) recommend that hardwood cuttings not be inserted outdoors where the soil temperatures are below 12°C in winter; but in most of the peach area of the southeastern United States, soil temperatures, to the 15-cm soil depth, drop below this temperature during December, January, and February. This study was initiated to determine if “in place” planting of unrooted peach hardwood cuttings is feasible in the southeastern U.S.

Hardwood cuttings from ‘Bicentennial’, ‘Harvester’, and ‘Redhaven’ peach trees were taken on October 20, November 20, and December 20, 1981, and on January 20, 1982. Cuttings were of wood produced in 1981 that was about 0.6 cm in diameter and 30 cm in length. Leaves were stripped from the Oc-

![Table 1. The influence of wounding, cultivar, and planting date on the survival of peach hardwood cuttings.](image)

<table>
<thead>
<tr>
<th>Date of planting</th>
<th>Survival (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not Wounded</td>
</tr>
<tr>
<td><strong>Harvester</strong></td>
<td></td>
</tr>
<tr>
<td>Oct. 20</td>
<td>28 b</td>
</tr>
<tr>
<td>Nov. 20</td>
<td>40 b</td>
</tr>
<tr>
<td>Dec. 20</td>
<td>29 b</td>
</tr>
<tr>
<td>Jan. 20</td>
<td>3 d</td>
</tr>
<tr>
<td><strong>Redhaven</strong></td>
<td></td>
</tr>
<tr>
<td>Oct. 20</td>
<td>16 c</td>
</tr>
<tr>
<td>Nov. 20</td>
<td>3 d</td>
</tr>
<tr>
<td>Dec. 20</td>
<td>2 d</td>
</tr>
<tr>
<td>Jan. 20</td>
<td>1 d</td>
</tr>
<tr>
<td><strong>Bicentennial</strong></td>
<td></td>
</tr>
<tr>
<td>Oct. 20</td>
<td>9 d</td>
</tr>
<tr>
<td>Nov. 20</td>
<td>1 d</td>
</tr>
<tr>
<td>Dec. 20</td>
<td>2 d</td>
</tr>
<tr>
<td>Jan. 20</td>
<td>1 d</td>
</tr>
</tbody>
</table>

1 Mean separation in rows or columns by Duncan’s multiple range test, 5% level.

---

Received for publication November 17, 1982. A contribution of the University of Georgia Agricultural Experiment Station, College Station, Athens. This research was supported by state and HATCH funds allocated to the Georgia Agricultural Experiment Station and by grant funds from the United States–Israel Binational Agricultural Research and Development Fund (Grant No. 1-198-80). The cost of publishing this paper was defrayed in part by the payment of page charges. Under postal regulations, this paper therefore must be hereby marked advertisement solely to indicate this fact.

1 Present address: Department of Horticulture, Atatürk University, Erzurum, Turkey.
2 Professor.