AIR ROOTING OF PEACH CUTTINGS

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Abstract. Semihardwood peach cuttings were successfully rooted by intermittently misting the bases and tops with water. Cultivar and cutting type (terminal or basal) did not affect rooting. Coverage with mist of the base and top of the cutting was essential for a high percentage of rooting.

REVIEW OF LITERATURE

Traditionally peaches (*Prunus persica* L. Batsch) are propagated as a two-part tree — rootstock and scion. Usually seeds are planted in the nursery row in fall. They are chilled during winter and germinate and grow the next spring. The scion cultivar is budded onto the seedling rootstock, the two unite, and the bud breaks and grows. The process requires much hand labor for the budding operation and for breaking off rootstock sprouts to assure adequate growth of the scion.

In recent years peach growers and researchers have sought methods to increase productivity of orchards. In many cases these attempts have involved planting more trees per unit of land (2, 4, 5, 6, 7). With these highly intensive production systems, the land area is covered with a tree canopy earlier in the orchard's life resulting in earlier economic fruit yields.

However, the relatively high cost of budded trees has made establishment costs for high-density orchards almost prohibitive. For example, standard peach orchards in the Southeastern U.S. are planted with approximately 250 trees per hectare (about 100 per acre) while the meadow orchard system being developed will require 5000 or more per hectare. Consequently, researchers have been developing methods to produce trees inexpensively. Most of these attempts have been aimed at providing own-rooted scions.

A number of successful attempts have been made at rooting hardwood peach cuttings (7, 8, 9, 10, 12). Where winter soil temperatures at a depth of 20 cm are 12°C or higher, hardwood cuttings may be rooted in the orchard site (7). However, in many areas soil temperatures are not suitable for this method. Another method that has been successfully used is rooting of semihardwood cuttings taken in early August, utilizing intermittent mist with vermiculite as the medium (3).

The research reported here involves attempts to root semihardwood peach cuttings without a rooting medium by misting

the tops and bases. Air rooting is not a new concept (1, 11, 12), but apparently has not been tried with peaches.

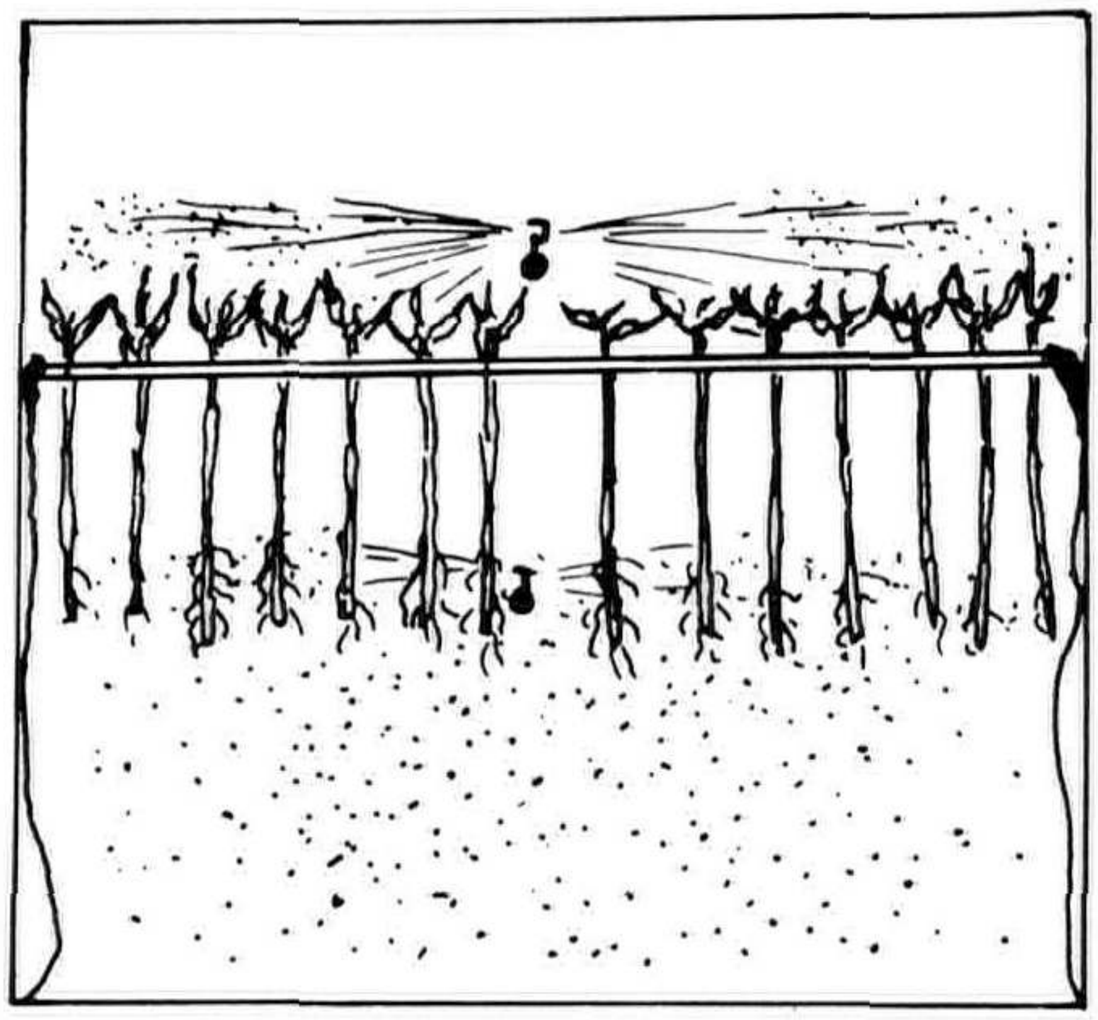

Figure 1. Diagram of the air rooting concept with mist on the bottom of the cuttings and over the cuttings.

MATERIALS AND METHODS

The first experiment used a 30.5 cm plexiglas cube painted black to exclude light. A deflective mist nozzle was mounted in the base of the cube and another above the cube. 'Redhaven' peach cuttings, approximately 25 cm long, taken in early August were wounded by removing bark on 2 sides from the lowest 4 to 5 cm. The bases of the wounded cuttings were dipped in 2500 ppm IBA in 50% ethanol for 5 sec. and inserted through holes drilled in the top of the box. Paper clips were placed 10 cm below the top of the cuttings to keep the bases suspended within the box. Mist was applied for 5 sec. each 2½ min. during daylight hours. Encouraging results from this initial test led to construction of a larger air rooting chamber.

A sheet of 2.5 cm thick styrofoam was suspended about 90 cm above the greenhouse floor. The top of the styrofoam was covered with aluminum foil to reduce light penetration. Black polyethylene was draped from the edges of the styrofoam to the floor to create a dark rooting chamber. A mist line with deflecting nozzles mounted 77 cm apart was placed 40 cm above the greenhouse floor and a second mist line was placed 30 cm above the styrofoam. Mist was applied through the two lines simultaneously for 5 seconds each 2½ minutes. Semi-hardwood cuttings of three cultivars — Redhaven, Springcrest, and Bicentennial — were taken in mid-September and treated as described previously. Cuttings were 35 to 50 cm long and were inserted through the styrofoam leaving 10 cm outside the chamber. Variables tested in this system were: position in the

box, type of cutting (basal or terminal), cultivar, and application of mist to the cutting base only.

RESULTS

With the plexiglas box in the initial test 73 of 75 'Redhaven' cuttings rooted within 3 weeks. Roots were evident on many of the cuttings within 7 days.

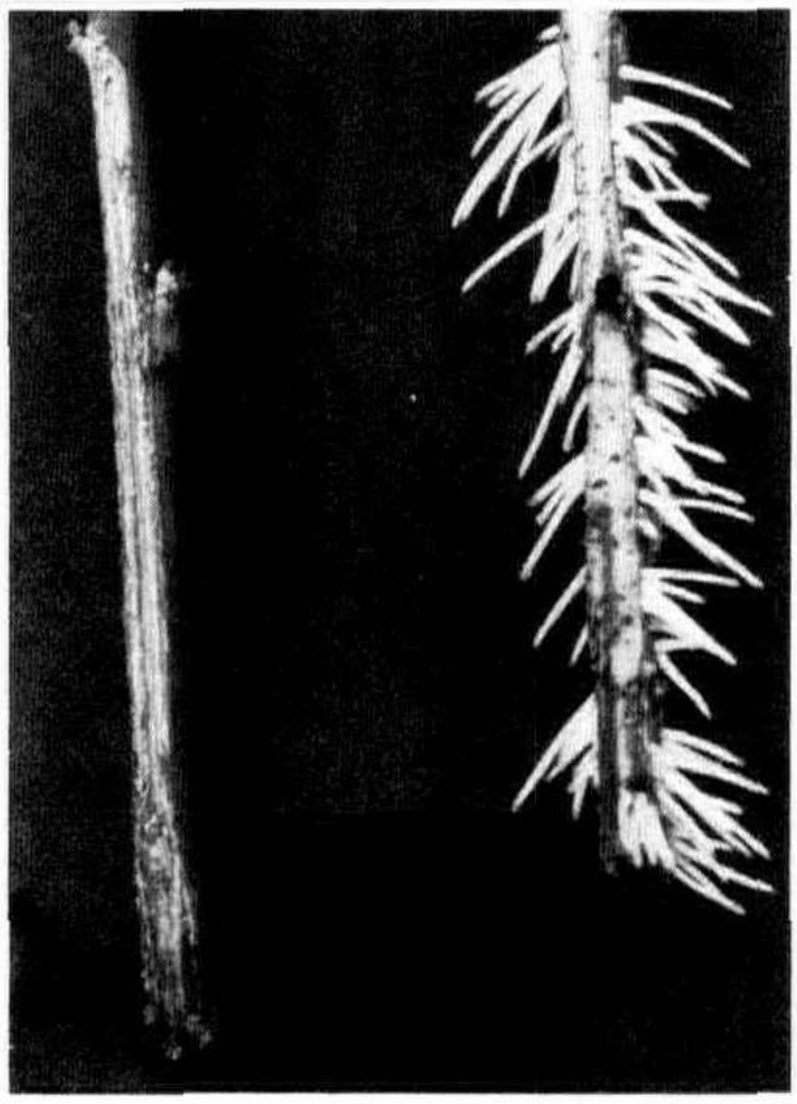

Figure 2. A 'Redhaven' peach cutting air-rooted (right) after 3 weeks in rooting chamber compared with a cutting (left) that only developed callus.

Cuttings were stuck in the styrofoam box September 18 to 22; callus was evident on cuttings in early October and roots were emerging by October 8. Rooting was evaluated in late October.

Cuttings near the center of the box (closer to the mist lines) rooted better than those near the edge (73% versus 48%). Of the edge cuttings which did not root, 40% callused.

The type of cutting (terminal or basal) had no effect on rooting. Also no differences were found in rooting among the 3 cultivars.

In another test 'Redhaven' cuttings that received bottom mist only did not root as well as cuttings receiving mist both above and beneath (27% vs. 65%).

DISCUSSION

Air rooting would provide an attractive system for propagating own-rooted peach trees without the expense of a rooting medium. The initial tests with the plexiglas box were quite

encouraging. However, the tests involving styrofoam demonstrated potential problems with the system. Time for taking cuttings in our area to obtain a high rooting percentage is late July through August (3 and Coston-unpublished data) when using vermiculite as a rooting medium. The results from the tests reported here suggest similar responses with air rooting.

Proper mist distribution is essential for good results. With the plexiglas box the tops and bases of the cuttings were well covered by mist. With the larger chamber the lack of adequate mist coverage at the outer edges greatly reduced rooting. Using a chamber that is narrower or using several mist lines to assure good coverage in all areas of the chamber should assure improved rooting. Also, the final test with 'Redhaven' cuttings demonstrated that for optimal results mist over the cuttings as well as beneath is essential.

Another essential ingredient to assure success is prompt removal of the rooted cuttings. Some of the cuttings in these tests were left in the chambers several weeks after rooting and *Fusarium* killed the roots.

Preliminary tests with several other plants (rabbiteye blueberry, hybrid rhododendron, wild deciduous azalea, crape myrtle, and juniper) indicate the potential for air rooting of cuttings taken in mid-September and processed similarly to the peach cuttings.

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LIN TABER: Are the rooted cuttings more susceptible to disease in the field than are the budded plants?

D. COSTON: We are only into our 4th year of growing rooted cuttings so we cannot be sure. However, 15-year-old plants in Georgia are doing well.

DON COVANT: How are plants irrigated in the field?

D. COSTON: We use drip irrigation.

SHIVU PATEL: Do the long roots create problems in transplanting and establishment?

D. COSTON: We have not encountered any.

JACK FINCH: The roots would seem to be fragile. How do you do the transplanting?

D.C. COSTON: We wrap them in damp paper and go right to the field. We have had no trouble.

PROPAGATION OF DECIDUOUS AZALEAS

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Our deciduous azalea propagation system has been developed over a 35 year period. We are currently producing about 60,000 plants yearly, which consist of several cultivars of the Exbury, Knapp Hill, and Ilam groups, as well as the Windsor hybrids.

Preparation of Stock Plants: Good healthy stock plants are essential for good cuttings. The majority of our cuttings come from our containerized stock that will be marketed at a future date. These plants are forced into growth in our standard overwintering houses. This commences sometime between February 15 and March 30. Proper maintenance of plants with regard to fertilizer levels and insect control is essential during this time.

Preparation of the Propagating Area: Preparation for a new crop begins by removing all old medium from the house