

Growing Plants in a Cinder Block

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INTRODUCTION

The main problems of growing tree seedlings in containers is development of the root system and blow-over of the plants. Improving root system quality and preventing wrapping and circling can be achieved with RootMaker™ and other air-root-pruning containers. An assortment of devices have been created to keep larger trees from blowing over. However, most of these techniques are not practical for container-grown trees during the first 1 or 2 years.

Each time a black plastic container blows over and the side is exposed to direct sunlight, roots on the exposed side are killed. In a study to determine these effects, sides of containers were exposed for precise times. The shortest exposure used was 15 min, which was sufficient to kill roots on the exposed side of the container. As a result, I had the idea of growing tree seedlings in the cavity of a cinder block with a liner made of fabric. Seedlings cannot blow over, roots are insulated from heat, and the plants are properly spaced for good top development. I had previously tried growing in cinder blocks without a liner and found growth to be excellent, but removal of the tree seedlings was so difficult that the procedure was dropped.

The Study. Initially, four cinder blocks were used with a cavity liner made of fabric with precise openings for root pruning. The eight oak trees planted in early Aug. 1996 did well. For 1997, nearly 1000 cinder blocks with 2000 cavities 13 × 14 × 20 cm (5 × 5.5 × 8 inches) were set up for a much more extensive study. Half of the blocks were placed on 6-mil poly and half on 6-ounce Typar™ which lets water through, yet prevents root growth into the soil below.

Bags were made of: (a) special knit fabric for root-pruning, (b) 3-ounce Typar, (c) 6-ounce Typar™, and (d) 5-ounce spun-bonded weed barrier fabric. The bags were filled with a soilless mix of pine bark, peat, and sand (3 : 1 : 1, by volume) amended with Osmocote and Micromax micronutrients, and placed in the block cavity.

Tree seedling liners of shumard (*Quercus shumardii*) and bur oak (*Q. macrocarpa*), lacebark elm (*Ulmus parvifolia*), Chinese pistache (*Pistachia chinese*), loblolly pine (*Pinus taeda*), catalpa (*Catalpa bignonioides*), redbud (*Cercis canadensis*), bald cypress (*Taxodium distichum*), and shantung maple (*Acer truncatum*) were grown to a height of 20 to 30 cm (8 to 12 inches) in 6 × 6 × 10 cm (2.5 × 2.5 × 4 inch) deep RootMaker™ propagation containers before being shifted to the block bags in late June 1997. Planting was done using a cone-shaped dibble that fits the RootMaker™ shape. Irrigation was by overhead sprinklers.

Plant Growth. Growth of all species was excellent (Fig. 1). Overall growth, stem diameter, and branching with the knit fabric bags was superior to all previous techniques tried (Fig. 2). Root systems were excellent if grown in the knit fabric (Fig. 3). On the other hand, tree seedlings grown in Typar™ (which restricts roots) circled and were deformed. The 5-ounce spun-bonded fabric had good growth but removal of the fabric was quite difficult.

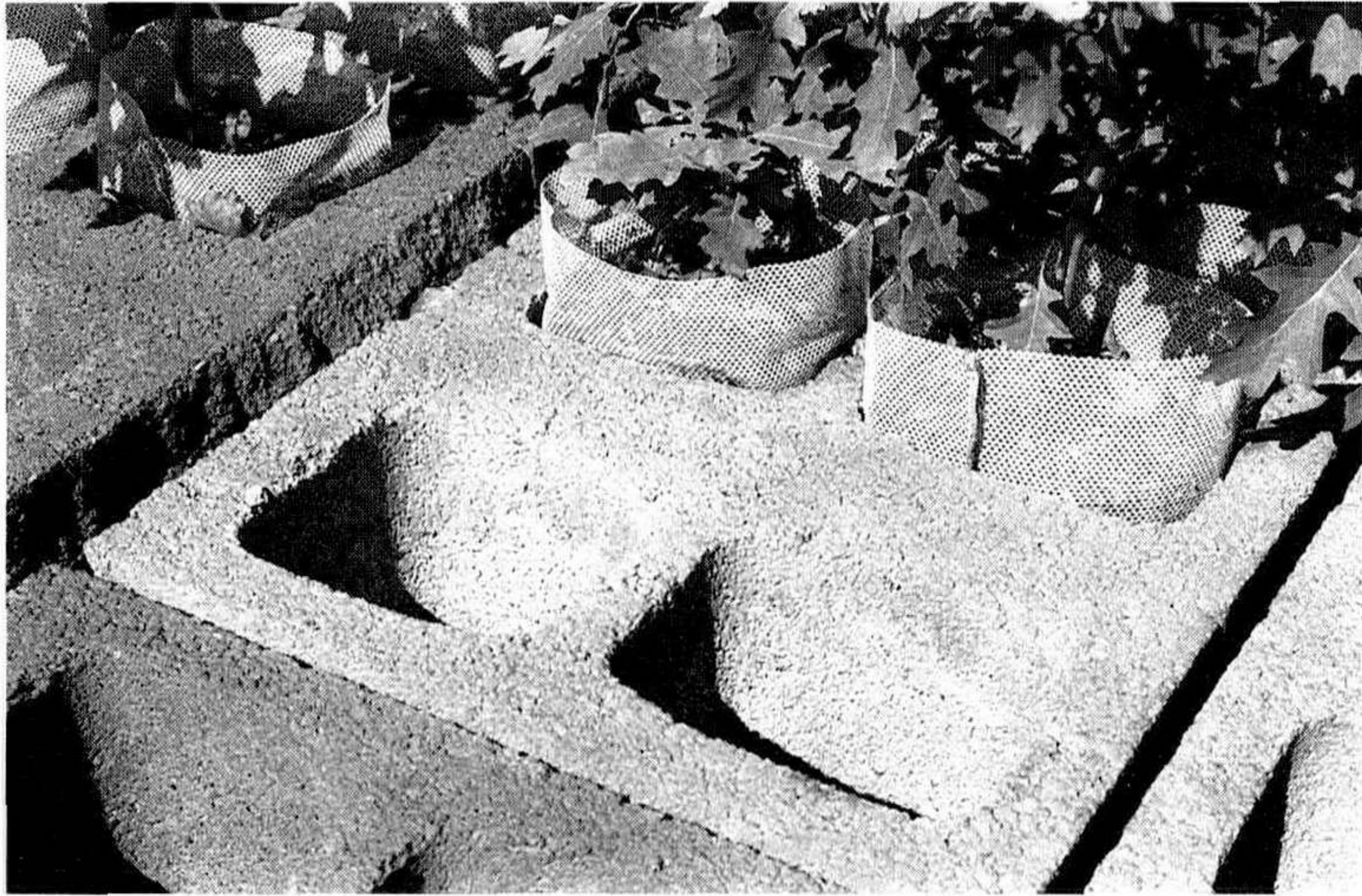


Figure 1. General view of tree seedlings in the cavities of 20 × 20 × 41 cm (8 × 8 × 16 inch) cinder blocks.

One of the surprises of this technique was the improvement of water availability and aeration to the root system. After watering any conventional container there is a saturated zone at the bottom. However, the cinder block is porous and both absorbs and releases water to aid plant growth; thus water availability is improved while also improving aeration.

In most areas grade-two cinder blocks are available at about half price. In my experimental area the set-up cost was about 30 cents per cavity, but longevity is indefinite. The trees planted in late June were 3 to 5 ft tall by mid-Oct. 1997. To transplant into the field for further growth, the trees were pulled from the cinder blocks using the stems, the fabric was removed by pulling off using the two folds at the bottom or by cutting down one side. All trees transplanted grew well in the field. The study was repeated in 1998 with similar results.

Evaluating Winter Root Damage. In Oct. 1998, one third of the trees were removed and planted in the field, while the rest were left in the blocks to evaluate overwintering. For comparison, three blocks and six trees of Shumard oak, Chinese pistache, and loblolly pine were moved to a poly-covered overwintering house. The minimum temperature experienced was -16°C (8°F) on two successive nights in Jan. 1999.

With the arrival of spring, the 18 trees that had overwintered in the blocks inside the poly house were planted into 3-gal containers. Trees of the three species and of similar size were removed from the blocks and also planted into 3-gal containers. Emergence of buds, length of the spring flush of growth, leaf size, and color were similar for both treatments. This indicates that the winter temperatures did not cause significant damage to roots in the cinder blocks.

Transplant Tolerance. Another question to be answered was the sensitivity or tolerance of the tree seedlings to removal and transplanting from the blocks during



Figure 2. Shumard oaks grown from late June to mid-October 1997. Note the stem diameter and natural branching of the seedling in the knit fabric and the absence of any support stake.

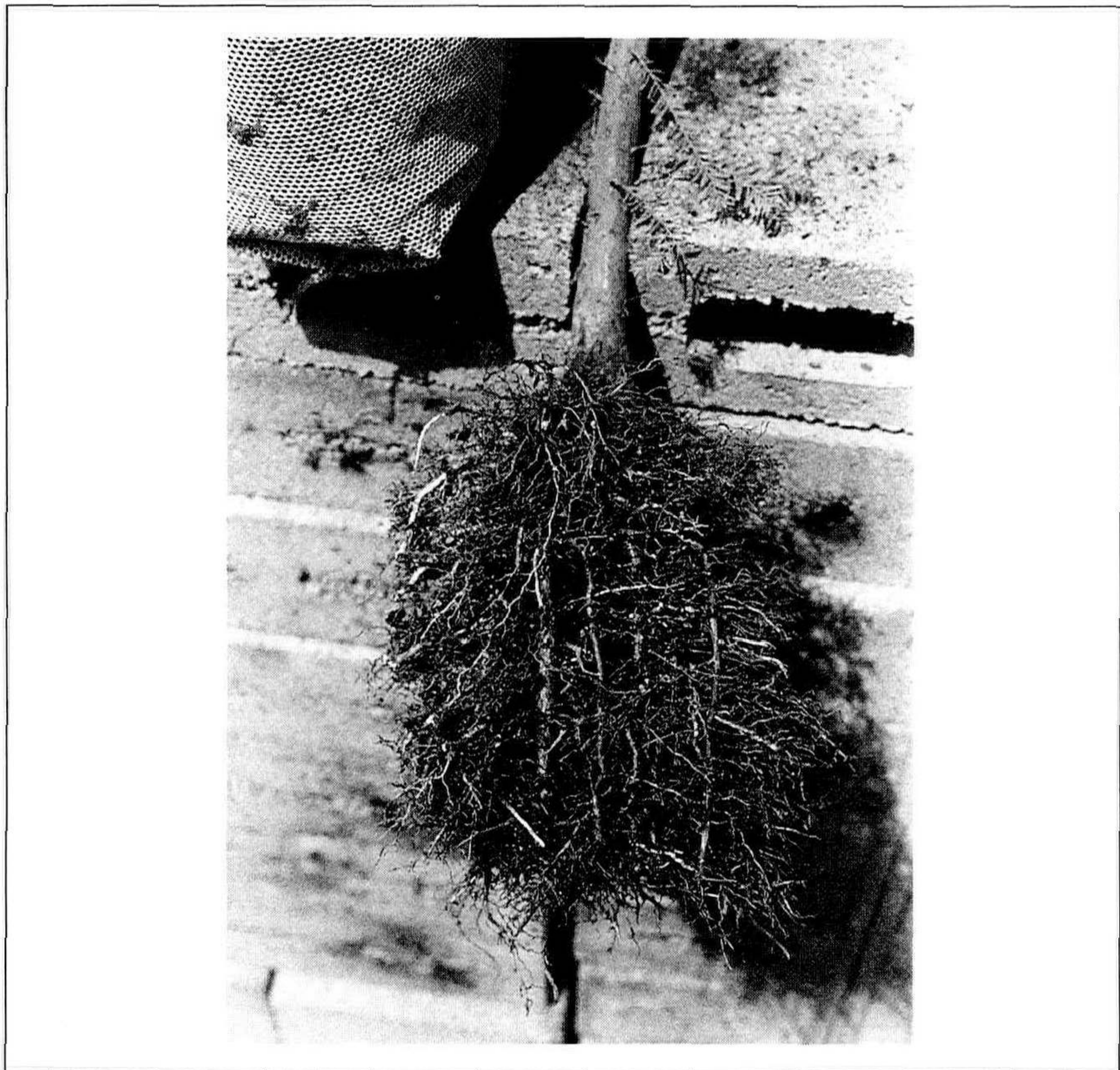


Figure 3. Root systems of a bald cypress tree grown in the 13-cm (5-inch) knit bag inside a cinder block for 4 months, then washed for inspection

the growing season. On August 3 and 4 Aug. 1999, when temperatures were consistently 35 to 38°C (95 to 100°F), 12 trees each of Shumard oak, Chinese pistache, and loblolly pine were pulled from the blocks, fabric was removed, and trees were transplanted into 3-gal RootMaker™ containers. All were hand-watered initially then irrigated by overhead sprinklers three times daily.

No leaves were lost nor was leaf damage observed with any of the three species. The Shumard oaks all made a modest flush of growth during the following 3 weeks. Eight of the Chinese pistache made new growth, while the other four simply matured the young tissue and developed a strong terminal bud for next spring. The loblolly pines made no new growth following transplanting. All three species increased stem diameter following transplanting.

No Staking. None of the trees grown in the cinder blocks were ever staked while in the block or after transplanting into larger containers or in the field. This benefit alone translates into substantial savings in time and labor.

Other Species Also Benefitted. Bearded iris, Japanese iris, calla lilies, lantana, plume grass, and oak leaf hydrangea were also grown in cinder blocks compared to conventional containers during the 1999 growing season. All species tested grew well and outperformed plants in conventional containers of similar volume.

SUMMARY

This technique provides several advantages over conventional plastic pots:

- Plants cannot blow over.
- Spacing is 20 cm (8 inches) on centers with standard 20 × 20 × 41 cm (8 × 8 × 16 inch) blocks.
- Roots are insulated from summer's heat.
- Roots are sufficiently insulated from winter's cold in USDA Zones 8 and 9, but may need some additional protection in Zone 7 or northward.
- Changes in moisture levels after irrigation is slowed by the water absorption and release by the block.
- Aeration to the root system is improved.
- Plants are easily removed at any time. Knit fabric is easy to remove and with some species can be reused.
- Set up cost is moderate, but longevity is indefinite. Six-ounce Typar™ worked best beneath the blocks.
- Roots in bags made of knit fabric did not circle.
- Roots in bags made of knit fabric were very fibrous and prime for transplanting by early fall.
- With most species tested, planting into the 13 cm (5 inch) bags in the cinder block during May or June, yielded excellent plants for transplanting into larger containers or planting into the field by early October.
- If tree seedlings are left in the blocks for two growing seasons, every other plant on a staggered arrangement should be removed to avoid over crowding and weak stems.