



Photo by Ellen Colodney

# Propagation Protocol for *Gordonia lasianthus*

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*Gordonia lasianthus* (L.) Ellis (Theaceae), commonly known as loblolly bay, is a small, broad-leaf evergreen, single-stemmed tree of unsurpassed beauty. It normally grows in wet, acid, nutrient-poor soils of the southeastern US coastal plain and is an important component of pocosin and Carolina bay ecosystems. The tree is sometimes grown commercially as an ornamental, although its use is limited by its cultural demands and a tendency to break during shipping.

**KEY WORDS:** loblolly bay, pocosin, cuttings, container seedlings

**NOMENCLATURE:** ITIS (2000)

In 1999, my nursery had an opportunity to supply 15,000 small *Gordonia lasianthus* plants to restore a Carolina bay ecosystem in North Carolina. The techniques we used to vegetatively propagate this species for wetland restoration are described below.

*Gordonia lasianthus* produces seeds in quantity from its large, fragrant white flowers that appear through much of the summer. Seeds (300,000/kg (135,000/lb); USDA NRCS [1999]) germinate readily, but seedlings are rarely observed in the wild. The mechanism of natural regeneration is unclear. It is possible that the species depends on fire clearing the ground for most regeneration; vegetative reproduction in the field after severe injury to the parent plant also seems quite strong.

Our observation that seedling survival in the wild appears poor gave us an ethical basis for vegetatively propagating the tree, rather than collecting seeds. For this I was quite grateful, because: 1) flowers are usually high up on the tree, rarely abundant, and bloom sporadically throughout the season; 2) the branches supporting flowers always break when one stands in the tree and attempts to put a collection device over the bloom; and 3) pocosins, where our donor trees live, are considered impenetrable (one could drop a lunch box at one's feet in a pocosin and never find it again, let alone a *Gordonia lasianthus* seed), and there is no place to stand a ladder. To compensate for what might have become a limited pool of genetic

material, we collected cuttings from a large number of wild growing trees (we stopped counting after tree number 50).

Collection took place in mid-May (USDA Zone 8, in the coastal plain of North Carolina) when the trees' new growth had firmed up a bit and would snap off the tree about 20 cm (8 in) back from the tip like the choice part of a fresh asparagus stalk. Only branches above the chest-high shrubby understory seemed to have sufficient current-year growth to obtain a decent cutting. Our collection was limited to ends of branches in the middle third of each tree, and we were able to obtain several 13- to 15-cm long (5- to 6-in) tip cuttings with a pencil-thick or thicker stem from most of these branches.

Outdoor temperatures reached nearly 38 °C (100 °F) during the collection period, but cuttings seemed to tolerate this fine if they were immediately sprinkled with ice water and placed in insulated containers to protect them during the drive back to the nursery. Cuttings were prepared and in mist beds within 12 h of collection.

We experimented with a number of ways to prepare cuttings; in the end, tip cuttings of crisp green wood, stripped of all but 2 to 3 firm leaves near the apical meristem, dipped 5 s in a 1:10 dilution of Wood's liquid rooting compound (Earth Science Products, PO Box 327, Wilsonville, Oregon 97070) rooted the most consistently. Clipping off the apical meristem had no influence; all cuttings had at least 1, and usually 2, nice growth spurts before winter set in. Cuttings were stuck into individual Spin-Out-treated (The Lerio Corporation, PO Box 2084, Mobile, Alabama 36652) containers filled 1.5:1 perlite:sphagnum peat moss medium so that subsequent roots would be pruned by the copper-coating and prevented from spiralling. Most containers held about 125 ml (8 in<sup>3</sup>) of medium; this was clearly too small—root systems were many-branched and filled the containers well, but cuttings in 10 X 10 X 10 cm (4 X 4 X 4 in) square containers had much more robust top growth. Overall, 77% of the cuttings were saleable 9 mo after being stuck.

Rooting took place under mist governed by a Mist-a-Matic™ (EC Geiger Inc, Box 285, Harleysville, Pennsylvania 19438) controller in raised outdoor tables covered with a lightweight porous, polypropylene, row cover (19 g/m<sup>2</sup> [0.55 oz/yd<sup>2</sup>]). With this system, protection from the hot afternoon sun was essential. Most cuttings had protection of dappled shade produced by scattered tall trees; those without such protection were provided 30% to 50% shade with cloth and even then suffered during especially hot days.

*Gordonia lasianthus* carries a wetland indicator status of FACW (facultative wetland; the species occurs in wetlands 67% to 99% of the time), but in our nursery its motto was clearly "hydrate or die." As foliage grew thick and lush, watering the small containers became very difficult, and the slightest spot of dryness in a plants' medium caused its irreversible demise within a few hours.

The soils *Gordonia* normally grows in are quite nutrient-poor and acidic, and it does not tolerate much fertilizer under cultivation. Plants, once well-rooted, were fertilized during each irrigation. We found that feeding with a 20N:10P<sub>2</sub>O<sub>5</sub>:10K<sub>2</sub>O liquid fertilizer, diluted to provide 25 ppm nitrogen, gave lush growth as long as irrigation water had a pH of 4.2 to 4.5. We used 35% sulfuric acid to keep pH of irrigation water this low.

We did not apply any pesticides to the plants. We found many predatory insects in the beds during the first few weeks after cuttings were stuck; the insects probably arrived on the cuttings. Some leaves were disfigured by insects (particularly cranberry cutworms (Lepidoptera:Noctuidae), which entered the unprotected bottoms of the tables from the ground at night), but damage was no more than cosmetic.

In our area, winters are fairly mild, and the plants only had to survive a few -9 °C (15 °F) nights at the nursery before their final outplanting in February. To provide some protection, we covered beds with a heavyweight porous, polypropylene, row cover (51 g/m<sup>2</sup> [1.5 oz/yd<sup>2</sup>]) that maintained an interior temperature > -2 °C (28 °F).

Transporting 15,000 broad leaf evergreen plants to the remote restoration site was a daunting task for the planting contractor. Because the species' root systems seemed as fragile as its branches, it was necessary to leave medium on the root balls intact, making transport even more difficult. We did remove the containers for the trip, however, with no adverse consequences.

Based on our experience, we have made some changes to subsequent crops of *Gordonia*. In 2000, we opted to start *Gordonia lasianthus* cuttings in 6 X 12 cm (2.5 X 5 in) RootMaker containers (RootMaker Products Co LLC, PO Box 14553, Huntsville, Alabama 35815-0553). These containers hold 235 ml (14.5 in<sup>3</sup>) of medium and prevent spiraling of roots by guiding them into openings that then cause air pruning. Finished plants will still be difficult to transport to remote locations, but we feel that the superior vigor of the plant will outweigh this disadvantage. We also changed the summer covers of the beds from the lightweight porous, polypropylene, row covers to plain nylon window screening, with white plastic stretch wrap part way up the sides. The new covers prevent extreme temperature rises while keeping mist from drifting excessively.

## REFERENCES

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