

# LINER PRODUCTION OF TEXAS NATIVE PLANTS

HELEN MATTHEWS

*Rennerwood Nursery  
Rt. 1, Box 238 A  
Tennessee Colony, Texas 75861*

We have been growing lining-out stock for eight years at Rennerwood Nursery. We grow about 60 cultivars and/or species of shade and ornamental trees in containers—no bareroot material. Less than half of these plants are Texas natives. Our liners range in size from a plug with a root mass 6 in. deep to 1- and 2-gal. containers. About 90% of our production is from seed and only 10% from cuttings.

## PROPAGATION BY SEED

Seedling production varies from year to year by species and quantities. We gather about 25% of our seed, mostly the oaks. The rest we get from seed companies and other growers with whom we trade seeds for liners. We often lose specific kinds of seeds to the weather, notably spring seed crops.

We have a refrigerated room for seed storage and stratification. Seeds requiring no pretreatment are direct seeded after collection. We either direct seed into our containers or pre-germinate in seed flats. Those seeds that germinate poorly, such as those of *Metasequoia*, *Chionanthus*, and *Ginkgo* are all put in seed flats. We use 288, 200, and 120 flats (referring to the number of the individual holes in the tray). We use an Old Mill Seeder<sup>1</sup> for all small seeds. This seeder can handle seeds from the size of *Oxydendrum* (5 million to the pound), up to a *Magnolia* or *Koelreuteria*. It cannot handle winged seeds or those *Ulmus* seeds that seem to be made of Velcro. With a little talcum powder, however, some pass through the machine. We normally run the seeder at a rate of 10,000 an hour with 97% accuracy. We can also double- or triple-seed those items with poor germination. After the seedlings appear in the seed flats and are ready to pull, we transfer them to our containers.

**Containers.** We grow the seedlings in a variety of containers: plugs, rose pots, 4-in. pots, milk cartons, and the Rootmaker. We use more plugs than anything else, the hard-plastic tray, not Styrofoam. We have used 4-in. and rose pots for some seeds, such as those of *Quercus macrocarpa* and *Aesculus glabra* var. *arguta*, which are too large for a plug. But now that we are using the Rootmaker with superior results, we will not be using as many 4-in. or rose pots. We no longer use milk cartons. Although they

---

<sup>1</sup> Available from Old Mill Company, Savage, MD 20763.

produced very large lining-out stock, the root system never showed much root branching as all roots were directed downward; and a tray of one pint milk cartons filled with wet mulch was just too heavy to handle and impossible to ship.

Then came the Rootmaker. Thank you, Dr. Carl Whitcomb. It is a real pleasure to produce a liner for field growers that has the root mass, height, caliper, and branching that this pot gives. There is no root spiraling—there are hundreds of root tips in a Rootmaker—and the 4-in. spacing of the containers gives maximum air circulation for developing caliper and branching and cuts down on fungal growth. I can water these seedlings in half the time because the plugs are so dense the foliage sheds much of the water.

There are fewer culls with this pot, and I think it is primarily due to the spacing where the seedling can develop caliper more easily. In a plug tray I have 96 seedlings competing for light in a 14 x 24 in. area. There are about 32 Rootmakers in that same area. In one sense that is a problem: I can only get 24,500 Rootmakers in a 28 x 96 ft house; I get 75,000 plugs in the same house. However, the Rootmaker produces a far superior plant, which commands a higher price.

Shipping is another problem when using the Rootmaker. The size of the plants and the weight of the root mass add up to a greater freight bill. Where I can put 50 plugs to a bag and 250 in a box, I can only get 20 Rootmakers in a bag and 120 in a box.

**Container mix.** I do have some control over this shipping problem with the mix I use in the containers. We use two mixes: one for plugs and one for 4-in. pots, rose pots, and milk cartons. The plug mix is peat moss, vermiculite, and perlite. The pot mix is pine bark, peat moss, and sand. This bark mix is a lot cheaper to use but weighs a lot more.

For the Rootmakers I have tried both mixes. I prefer the peat moss mix. It is much lighter for handling and shipping, and I believe it is an easier medium for root development. It holds together better when you pull the liners and when you ship them. Often the bark mix falls away from the root mass on the top and edges.

We must separate these two mixes when we put them in a house. The peat mix will be on one side of the house and the bark mix on the other side. Each side is separately controlled for water. Contrary to most thinking, our peat moss requires more water. This is especially true for those houses with no shade cloth. Once that peat dries out, it shrinks from the sides of the containers. The density of the plugs also necessitates a longer watering period.

All of our containers are set on wire for air pruning of roots. We do not have benches, so we set the wire on 1- or 2-gal pots. The Rootmaker fits beautifully on 1 x 2 in. welded wire. Without benches it is much easier to clean the houses and move our stock around.

For the 1- and 2-gal. stock, we use the same pine bark mix but with a coarser grade of bark. All this stock comes from our own seedlings and is transplanted according to when the seedling is ready to pull and when the grower wants the plant. Most of our contracts call for fall delivery, so most of our transplanting takes place in April and May. Some species require more time to develop, such as ginkgos, magnolias, and Austrian pine (*Pinus nigra*). These we try to pull first. Others such as *Liquidambar*, *Betula nigra*, and *Taxodium*, require less time to grow off, so we try to delay their schedule.

Our one gallon containers are set in remesh wire, and T-post hooks are used to hook the wire over the edge of the pot. We never have to pick up a pot after a storm nor suffer wind damage to fallen trees. It also provides uniform spacing. In addition to our full-sun field, we utilize a natural shade area for understory trees like *Cornus* and certain *Acer* spp.

### TEXAS NATIVE PLANTS

*Acer grandidentatum*, big-tooth maple, is one of several native Texas trees we grow. Many of the natives, such as *Quercus* and *Magnolia* species, are common to other areas. However, even when we geographically share a species, we probably treat the seed differently because of our weather. In Zone 8, *Cornus florida* seed requires a long stratification period for good germination—up to 120 days.

We grow several of the Texas natives that may not be familiar to persons in other areas. Following is a description of these plants and how we handle the seed:

*Cercis texensis*, Texas redbud, has a much shinier leaf than the eastern redbud but it is not as shiny or large as the Oklahoma redbud. We scarify seed in sulphuric acid for 30 to 60 min. followed by a 90-day moist, cold stratification.

*Sophora secundiflora*, Texas mountain laurel, is another Texas native that requires an acid treatment of seed. Soak one hour in sulphuric acid and plant immediately upon rinsing.

*Pithecellobium flexicaule*, Texas ebony seed also requires a one-hour acid treatment just before planting.

*Ungnadia speciosa*, Mexican buckeye, and *Aesculus glabra* var. *arguta*, Texas buckeye, seed are both planted as soon as they are collected, as are seed of *Chilopsis linearis*, desert willow, and *Diospyros texana*, Texas or Mexican persimmon. Cold storage of persimmon seed will induce dormancy and delay germination.

Of the oaks, *Quercus muehlenbergii*, or chinkapin oak, is really the only oak I delay planting until spring. *Q. virginiana*, *Q. phellos*, and *Q. shumardii* seed are all planted immediately after collection.

*Q. macrocarpa* is planted fresh or may be held in cold storage 30 days before planting.

One of the most popular Texas natives is *Prunus mexicana*, Mexican plum. This small tree is the first to bloom in Texas, before *Cercis*, *Cornus*, and *Sassafras*. It is often evergreen. Its flowers are white or pink. If you can beat the wildlife to the seeds, it requires an after-ripening period of 3 months in warm, moist stratification followed by a 2- to 3-month cold stratification period.

The big-tooth or lost maple, *Acer grandidentatum*, is a much-desired tree in Texas, but seeds are almost impossible to find. Since it thrives in alkaline soil, the demand for it is great, especially in large market areas such as Dallas. A 2-week water soak, followed by 4-months cold, moist stratification produces 20% seed germination. Our greatest problem with these beautiful and unusual Texas natives is the seed source. Some species are so isolated that collecting seed requires a 4-day safari with a guide.

### PROPAGATION BY CUTTINGS

DeVos and Kosar hybrid magnolias make up the bulk of our propagation by cuttings. We also take cuttings of *Lagerstroemia*, and certain species for which we may not easily find seeds, including *Gordonia lasianthus* and *Chilopsis linearis*. The magnolias and gordonia have been easy for us to propagate by cuttings with no rooting hormone. *Chilopsis* is more difficult. Its aversion to water makes it difficult to coordinate under mist with such water lovers as *Lagerstroemia*. It cannot be kept moist in a cold room; therefore, we take only the number of cuttings we can stick right away. We direct stick all our cuttings in individual pots in the pine bark mix.

### TRENDS

The magnolias appear to be gaining in popularity and use. Other trends we see from liner bookings are: more interest in the *Metasequoia glyptostroboides* (dawn redwood); less interest in the *Quercus shumardii* with a possible replacement of it by the *Quercus nuttallii*. There is increased use of Texas natives, especially the Mexican plum and Texas redbud. The bur oak (*Quercus macrocarpa*), is the most sought after tree in Texas, closely followed by the chinkapin oak.

Whatever the species, the overall trend in liner production has been to go to the field with larger containers. Field growers are finding that they cannot get the growth on their lining-out stock in the field that they can get from a container in a comparable period of time. It is less expensive to pay the difference between a plug and a 1-gal. at the outset than to grow off the plug to the same 1-gal. size in the field.