

## An Amateur's Method for Growing Magnolias from Seed

by PHILIP J. SAVAGE, JR.

This gentle-eyed man with the soft German accent was better, and vastly more experienced at every type of plant propagation than I. His cuttings always rooted; his grafts always "took". "You can't grow magnolias from seed in Michigan," John said. "Indoors they rot; outdoors not one comes up." The year was 1948, and I had just harvested thirty seeds from a fruit produced by a flower of *Magnolia sieboldii* var. *semi-plena* on which I had applied pollen of *M. virginiana*. Being quite excited about my first hopefully hybrid magnolia seeds, I had driven thirty miles to ask the late John Riemann's advice. Feeling rather stunned at his answer, I returned home and with scant hope planted fifteen of my treasures in a wooden seed flat on our fruit cellar window sill, and fifteen outdoors in well firmed, cultivated soil. Like John said, the indoor seeds rotted, and the outdoor lot never came up. "Probably apomicts anyway," I muttered, like Aesop's fox.

In the years since 1948, I have gathered good ideas from other people, added some of my own, and arrived by trial and costly error at a method of growing magnolia seeds that is expensive and space consuming, but which works just about every time. Given just one viable magnolia seed, I now have confidence I can turn it into a tree, and that is a confidence I never had before.

Most articles I have read on growing magnolias from seed commence by stating with pontifical finality that, "the seed must be cleaned of its fleshy outer covering and planted at once, or the oily endosperm will rot, killing the embryo." The turning point from near complete failure to modest success in my production of seedlings took place at the Society's Memphis meeting in 1967 when Joe McDaniel advised me, paradoxically, not to plant at once and introduced me to the plastic sandwich bag.

Under ideal conditions in nature, a magnolia seed is cleaned of its scarlet outer flesh by a fruit eating bird, and falls onto a bed of leaf mould in a sheltered spot. Covered by autumn leaves, it spends the winter moist but not wet, cold but not frozen, so when the spring sun warms the earth, it is ready to start its battle for survival against even more staggering odds. Surely no more than one magnolia seed out of a thousand survives even to this precarious point against the gimlet eyes of seed eating birds, the radar of the white-footed mouse and the oozing embrace of the slug.

As an alternative, let's suppose the same magnolia seed was harvested by human hands, gently cleaned of its fragrant outer flesh, washed lightly and popped into a plastic sandwich bag which is then tied air tight with string and put in the crisper drawer of a well regulated refrigerator at

thirty-four to forty degrees F. It spends the winter moist but not wet, cold but not frozen, and completely protected from the ravaging fauna of the forest floor. When spring comes to stay, the seed can be planted in good sandy loam outdoors, or much better, in a good sharp-draining potting soil in the type of container soon to be described.

By the good rule of "first things first," I suppose the production of magnolia seeds should be discussed before the planting. Collection and proper storage of pollen; determining the exact time to apply pollen to stigmas; protecting the flower against other unwanted pollen, are all steps that take place before planting and growing of seed. Actually they are necessary mainly in the production of hybrid seed, which is a subject of sufficient complexity to require treatment in an article of its own, and such an article is scheduled to appear in one of the 1974 Newsletters.

To reverse the logic of "first things first," let us say you become a successful magnolia breeder and produce a bountiful crop of promising hybrid seed, which you then proceed to kill, as I did in 1948 (and many years thereafter) by improper growing methods. You have accomplished nothing and have wasted much effort. On the other hand, if you can plant seed and grow seedlings with a good percentage of success, you can collect it in the wild, or in parks (often quite wild these days); in botanical gardens - with permission of the director, or, if present plans should mature, you may soon buy seeds from the Magnolia Society. You can come up with choice forms of species that are every bit as valuable as hybrids between species, and in addition you can produce vigorous and uniform understocks on which to chip-bud any magnolias you fancy.

Temperate magnolia species show wide variation in the dates their seeds become ripe. I have harvested seed of *M. fraseri* on Aug. 16, fully ripe and dangling out of the open carpels. I have harvested fruits of *M. denudata* on Nov. 10, after several hard frosts, with not a carpel open. As a safe rule to follow, harvest any fruit with splitting carpels at once, and all fruits by Oct. 20, splitting or not. An exception would be the late blooming *M. grandiflora* in warm, southern areas.

A useful aid in harvesting magnolis fruits from large trees is easily made by buying one or more ten foot sections of the rigid electrical conduit



Figure 1

Pass #9 wire through 1/8" hole drilled in "thinwall" one inch from end, then wrap around as shown.



known at your hardware store as "half-inch thinwall," and fastening a "chicken catcher" made of number nine wire to one end (Fig. 1). Try one length of thinwall first, and if you find you must reach higher, slip-on unions are available to quickly attach and detach extra footage. I made mine in four, five-foot sections, for easy stowage in the car trunk. Hook the fruit at its stem end, and a slight twist will break it free. Bear in mind that well filled fruits contain up to two hundred seeds each, and that you will quickly forget which seeds came from which tree unless you tag them.

You can solve the problem of too many seeds by donating your surplus to the Society's projected "Seed Counter." You can solve the second problem by buying a packet of one hundred heavy manila shipping tags in the 3 1/4 by 1 5/8 size. Most office equipment stores carry them. If this size is not available, get larger ones, but don't be without manila shipping tags, and pieces of strong cord six or eight inches long.

Tag everything. Tag to a point that seems ridiculous. It will save guesswork and confusion later on. When you label a magnolia fruit, use a ball-point pen to note the species name and other information on the tag, so you will know the exact background of that lot of seed. To baffle birds and squirrels, it helps if you can tie a little cloth bag around any developing fruits you can reach. Pieces of old nylon stockings make good protectors, but any fairly fine mesh cloth that admits air freely will do. An added advantage to such bags is that they catch and hold the seeds if you are not able to be johnny-on-the-spot when the carpels open. Bunches of choice table grapes often come packed in sleeves of plastic netting. This can be used to fend off squirrels but the mesh is too coarse to hold seeds. I use them anyway, because I like grapes. If the trees whose seeds you covet are in a public place, it is best to neither tag nor bag. Various age groups of *Homo sapiens* can be a bigger pest than birds and squirrels if their curiosity is aroused.

When the first carpels begin to split, snip off the fruits and take them indoors. Lay them on paper plates or trays with their tag or tags and put them in a cool, airy place, out of direct sun, to dry and open. When all carpels have opened, collect the seeds and put them in paper cups or bowls and add cool water to cover, as the cook books say. Attach the proper tag to the cup by a rubber band and let the seeds soak for three to six days until the pulpy scarlet covering becomes soft and mushy. When the proper stage is reached, a slight squeeze between thumb and forefinger will pop out the hard coated seed, usually, but not always, black in color. I like to wash these plump, black seeds in a basin with a little cool, soapy water to remove any clinging pulp and oil, then rinse several times, after which they have a delightful slippery feeling, and a faint, spicy scent.

Flat, scalelike seeds should be discarded. Those that sink in water are preferable to floaters, although the latter surprisingly, sometimes grow. To a pint or so of water, now add half a teaspoon of Captan. Your next move is to pop them into a plastic sandwich bag, (Glad bag or Baggies are always available) with just the water and Captan that clings to them. Pour out any pourable amount of water and close the bag tightly with strong twine, to which affix the same tag that has been with them all the way, and put them, as described before, in the non-freezing, "vegetable crisper tray" of your



refrigerator. Every few weeks they should be inspected, to make sure they are still moist, but not wet.

I use a calcined clay product known as "Turface" in my soil mix, and in recent years have started adding a level teaspoonful of the fine, or medium grade of Turface to each plastic bag of seed. Turface looks like ground up flower pots and absorbs and holds water, turning a dark red-brown in the process. With this absorbed reserve, seeds will usually be kept at proper moisture level throughout the dormant season. Should the Turface in one or more bags become lighter in color, it will remind you to add a few drops of water to those particular bags and to check to see if they are airtight. If your wife worries about the "Captan" fungicide being in her refrigerator, you can assure her that Captan is only one fifth as toxic to mammals as table salt.

If in checking your seeds, you find them frozen together, adjust your refrigerator temperature control upward. The seeds are usually unharmed by a short spell below freezing. A lengthy chilling is necessary to produce uniform first-year germination, so as your plastic bags of moist but not wet seeds slumber safely through the winter, you can get ready for spring planting at your leisure.

Up to this point, the *modus operandi* is the same for amateur gardener and professional nurseryman alike. An amateur is defined as a person who performs some activity for the sheer love of it, while a professional may love it as much, but must keep a sharp eye on the well known "bottom line."

On a commercial basis, most tree seeds are handled in one of two ways. They may be treated with a rodenticide and sown directly in cultivated soil, outdoors, or they may be sown in wooden "flats" in a greenhouse, transplanted to thumb pots when the first true leaves appear, repotted at least once and preferably twice, and then "lined out" in cultivated ground for further development. In magnolias, the outdoor seeding method is used (in areas where winter soil freezing is limited to an occasional crust on the surface) for the production of understocks on which to graft or bud the relatively small number of magnolia species and cultivars that root poorly as cuttings. The second, or "pot and re-pot" method is used for the rather tiny number of species magnolias produced by specialist nurseries in the United States, Canada, England, and Europe.

If you are, like myself, an amateur magnolia grower, and like 'enry 'iggins in that delightful musical, you are "just an ordinary man," with ordinary equipment and no pool of stoop labor available, you may find the methods here described useful. Professional they are not.

An amateur who wants to grow a dozen or two magnolias from seed does not want to go through the pot and re-pot, line out, cultivate and transplant routine that is second nature to the experienced professional. Usually he or she devote only a small amount of time to a hobby and the rules laid down for mass production of nursery stock seem alarmingly complex. Such axioms as, "soil must be steamed," and, "first stratify your seed," are sure to turn off the enthusiasm of most hobbyists.

About seven years ago I decided what I needed was an all round simpler and safer system where only one transplanting was required between seed

and specimen plant. Magnolias as a rule resent transplanting. Their roots are as juicy and brittle as water chestnuts, and the less handled the better. In a small pot magnolia roots curl and tangle in a corkscrew pattern which nearly always means trouble later. If left a few weeks too long in a conventional seed flat, the roots quickly become a hopelessly tangled mess. Improvement was needed.

Having a few empty "Camellia Tubs" or sixteen inch regular unglazed flower pots available, I first tried planting magnolia seed in these. Growth was not as good as expected, and a persistent chlorosis stunted the seedlings. I found transplanting as risky as before, and the chlorosis continued even when the plants were moved to cultivated ground outdoors. Chelated iron and trace elements did not help and I finally realized the problem was a combination of overwatering and slow drainage. I was quite surprised at this because even though terra-cotta pots are heavy, breakable and relatively expensive, greenhouse operators are reluctant to abandon them for cheaper materials because of the excellent soil aeration and resultant deep root growth made possible by the porous nature of the pot wall.



Figure 2

In experiments to obtain deeper roots on my seedlings, I tried standing a four inch diameter, unglazed field tile upright on the bottom of a sixteen inch pot, surrounding the drain hole (Fig. 2). Between the pot wall and the field tile I covered the bottom evenly with a pound coffee can full of extra coarse Turface (pea gravel will do as well) with half a can of regular Turface spread over the extra coarse material. Sharp masons sand will do nearly as well. The area inside the field tile surrounding the drain hole is left uncovered. With the new pot style and a lighter soil mix I was delighted to find my seedlings grew four or five times as large in a year as previously, with a fine deep root system going right into the Turface at the bottom of the pot.

A very acceptable potting soil can be made by thoroughly blending three parts of good sandy loam topsoil with two parts sphagnum peat (Canadian, German, Danish or Irish baled peat) and one part "regular" size



Turface. These proportions are by volume, not weight, and considerable leeway is allowable. Break up the peat with your hands and press it down lightly in your measuring container. Small quantities of soil mix can be prepared by dumping the ingredients into a wheelbarrow and blending with a small shovel or hoe.

The calcined clay product called Turface is made by the B.A.S.F. Wyandotte Corp. at Blue Mountain, Miss. Any large commercial greenhouse in your area can get a bag or two of Turface for you. It comes in regular, coarse and extra coarse grades. If no one has heard of it, write B.A.S.F. Wyandotte Corp., 1609 Biddle St., Wyandotte, Michigan, and ask for the name of your nearest distributor. Other calcinated clay soil conditioners will do just as well. I have not found Horticultural Perlite a good substitute, and vermiculite even less so.

When your sixteen inch pot is prepared, with the drain tile like a chimney in the middle, and Turface providing drainage on the bottom around the tile, fill the space between pot wall and tile halfway up with your potting mix. Dissolve a level tablespoon of Ra-Pid-Gro fertilizer in a gallon of water and pour it on the potting soil until well soaked. Add more soil mix to about an inch below the top of the pot, and again soak thoroughly with the fertilizer solution. Let pots drain a few days before planting.

When warm weather arrives, which in this latitude is about May first, get the seed you intend to plant out of your refrigerator, treat it again against fungi with a Captan solution as described before and evenly space eight seeds close to the outside wall of each pot, with four more about a half inch from the tile. Plant seeds about one half inch deep and press soil down firmly. Seeds will sprout in about three weeks (Fig. 3). Note the tags attached to wire stakes. These same tags have been with their lots of hybrid seed since the flower was pollinated, with such pertinent information as date of



harvest and date of planting added. Sometimes, particularly when weather is cool and cloudy, the cotyledons will not break out of the outer membrane and will sit like a bean on top of their little stem. With a pair of small tweezers try and catch the membrane at the point where the stem emerges at the bottom of the seed, and gently, very gently, tear it upward in strips to release the cotyledons. A strong reading glass helps. Even if you tear up the cotyledons quite badly, the seed will still grow. If you rip them off altogether though, c'est fini.

Unless you are planting your seed in a mouse tight building, prepare before planting to foil the best laid plans of *Peromyscus*, the white-footed or deer mouse. A tight fitting cylinder of quarter inch mesh hardware cloth or metal window screen the same circumference as the top of the pot and extending a foot or so above it with a circular top of the same material wired or tied to it will protect you from mice and still allow some growing room. As soon as the seedlings have two or three true leaves, mice won't bother them. Prepare ahead for slugs with either slug bait, Hopkins is a good brand, Slugit, or Dow's Zectran. Don't take them lightly. One slug in one night can destroy twelve fine seedlings in a pot. Since your soil is not sterilized, you may have potted up a cutworm in one or more of your pots. Before you find beheaded seedlings, circumvent this King Herod of the insect world by dusting the surface of the soil very lightly with 10% Chlordane or 5% Sevin. Zectran will get both slugs and cutworms. These three are about the extent of your competition.

Through the years I have probably lost more promising seeds to white-footed mice than to any other varmint. So slick are they that no trace of their visit can be seen, and you don't know you have been robbed until, as John Reimann said, "Not one comes up." Although I can liquidate bothersome beasts the size of foxes and 'possums with the cheerful detachment of a Nazi, I just can't kill white footed mice. It's not a fair fight. Imagine the plight of the F.B.I. if John Dillinger in his prime had the face and form of Shirley Temple!

When your seedlings are up and growing move the pots to a patio or picnic table where you can water them easily, and for a while cut down the sun about 50% by putting them in the shade of a tree, or your house. Every two weeks dissolve a level teaspoonful of Ra-Pid-Gro in a gallon of water and supply what water they require with that. Don't overwater. You can use any surplus on your garden.

When hard frosts come in October, look for a place where they will be cold, but where the soil in the pots won't freeze. An unheated attached garage, a fruit cellar window, or best of all, a greenhouse with the thermostat set at 35 degrees will get them through their first winter (Fig. 4).

If you don't have a greenhouse, the early spring may be the most trying time of all because your young magnolias may wake up, like children on a Sunday morning, long before they can be allowed outside. If the weather is still unsettled when they leaf out, put them in the brightest spot possible, and supplement with electric lights for a few hours a day until danger of frost is over.

Fig. 5 shows the response of magnolia seedlings to varying amounts of soil. There are twelve seedlings of *M. sprengeri* var. 'Diva' in each



Figure 4



Figure 5

container. The soil mix is the same for all, and the same fertilizing schedule was followed. The date is June 1st, and all the plants are thirteen months from seed. Note shovel for scale. Plants in large pot can be moved directly to specimen spots in lawn or garden. The smaller plants will not be that size for two more years, even if lined out at once in good soil and cultivated.

After the first flush of "spring" growth, these magnolias will firm up the new shoots and make a bud toward the end of June, in this area. Before "summer" growth starts they can be moved quickly without too much chance of wilting.

A straight sided hole is dug to the same depth as the soil in the pot. I dig these holes with a long, narrow bladed "drain spade." The tile in the center is next carefully lifted straight up out of the pot, leaving a round hole right to the bottom. I next use a razor sharp grass hook or sickle to slice from the bottom of this center hole over to the pot wall, and then carefully cut straight up halfway between two plants. Another cut halfway between the next two plants leaves one plant free and ready to be lifted out. With one hand down the center hole and fingers pushed along the bottom to the pot wall, and the other hand gently lifting the stem, the plant with practically its entire root system intact can be lifted up and placed in its new "cut to fit" location. Going right around like slicing an angel food cake, transplants these magnolias as fast as you can dig holes to receive them. Have good sandy loam available to sift around the plant in its new home, and a broomstick to gently tamp it from the bottom up as you fill. If properly watered and cared for, these yearlings will put on another foot of summer growth before hardening up for the winter.



In Figure 6, daughter Laura (exactly five feet tall) makes scale beside a nicely branched *M. sprengeri* moved the previous year as described in the last paragraph and two years old to the day from seed. This plant was unhurt by twelve degrees below zero F. the winter after transplanting.

Fig. 7 shows twelve year old Laura beside a four year old *M. acuminata* hybrid, carrying a dozen flower buds for spring 1974. Pot grown from seed and transplanted as described above, the magnolia seems very precocious. Fortunately the college jersey on Lor does not indicate the same and is a joking gift from one of her Michigan State brothers.

The above method would seem equally applicable to oaks, hickories, and other trees an amateur might wish to propagate from seed.

Those interested in larger scale production of magnolias would be well advised to obtain a copy of "Plant Propagation Practices" by Mr. James S. Wells, published at \$7.95 by the Macmillan Company, 866 Third Ave., New York, N.Y. 10022. It is usually available from the American Nurseryman, Book Dept., 343 South Dearborn St., Chicago, Ill. 60604. An entire chapter (24) is devoted to magnolias.

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FIGURE 6 (below)

FIGURE 7 (right)

