THE UNIVERSITY of TENNESSEE Extension

Propagation Bed Construction — for seed or cuttings

by Mark Halcomb
UT Extension Area Nursery Specialist
(10-2002; Revised 7-2009, 10-10, 2-12)

Reference Book

"The Reference Manual of Woody Plant Propagation" by Dirr and Heuser and "Seeds of Woody Plants in North America" by Young and Young, which is a slight revision of USDA Agr. Handbook #450 (Handbook #450 has been reprinted but not revised as hoped.) can be ordered by phone, fax, mail, email or web site from the following:

American Nurseryman Publishing Co. 1-800-621-5727 http://store.amerinursery.com/

Timber Press, Inc. 1-800-327-5680 Email: sales@timberpress.com www.timberpress.com/

Ball Publishing Bookshelf 1-888-888-0013 http://www.ballbookshelf.com/

The Reference Manual contains chapters on seed production, cutting propagation, grafting (budding) and tissue culture; but most of the book is devoted to detailed procedures of how to propagate individual plants.

Visit other producers. Ask what they would do differently if starting out.

Propagation Houses vs. Ground Beds

Many newcomers assume that a greenhouse is required to propagate. I think they just want a greenhouse. Greenhouses are more glamorous than ground beds. Truth is, no one to my knowledge propagates woody ornamentals in a greenhouse in Middle Tennessee. It is too expensive. To qualify as a greenhouse, the structure must be heated and perhaps even cooled.

Ground beds are very adequate. One nursery had more than 650 -4' x 48' ground beds. A few commercial propagators built a few Quonset houses to root in merely for labor convenience when the weather limits work outdoors. One removed his.

The house width should be based on the width of the beds planned. Bed width is based on labor's ability to reach without stepping in the bed. A 2 x 10 inch board can be laid across the edging timbers to facilitate sticking, allowing one to sit with feet still in aisle.

Dutch doors allow ventilation, while keeping most critters except cats out.

Site Selection
Full sun, away from tree roots. Tree roots will proliferate in the beds; pulling moisture and nutrients away from the crop. Desirable tree roots will be killed by methyl bromide fumigation and eventually the tree. Basamid will probably not kill as many roots.

A deep, well-drained soil with enough slope to carry excess rainfall away.

Check for nematodes if the history of the site may have had soybeans, okra, tomatoes, peppers any members of the *Prunus* family within the past 10 years or so. Soybean cyst nematodes can be found year round, but the others need to be checked for May through Sept., because they die off during the winter. Request information of how and where to send the nematode sample. A soil sample for fertility can be pulled anytime that it is not too wet.

Solve any perennial weed problems early. Kill any johnsongrass, bermudagrass, etc. Don't plan beds where an existing nutsedge population is and don't introduce it with additional soil.

The Bed
It is best to orient the beds North-South for best growth of all the plants.

A 4' x 48' bed is the standard size; (6,200 - 6,800) 7,000 cuttings per bed on average. A bed can be any length, but consider the length of poly. Poly comes 100', but is normally cut at 102'.

The length of the bed should be level; so that the irrigation nozzles will be level and provide uniform coverage without flooding the low end. Do not lay poly, fabric or gravel down first. Poly could cause root rot. It also interferes with tillage later.

The center length of the bed should be crowned to encourage drainage to the sides.

We use to think beds had to have a wooden border of some sort to nail/secure the poly and shade cloth to. Cross-ties are difficult and expensive to come by, landscape timbers and even pressure treated 2x6's rot in only a few years. Timbers are not essential and are actually in the way of mechanical harvesting with 4 foot wide bed lifters. Spacing considerations must allow for tractor tires.

Photos of beds are on pg 6 and 7 of UT Ag. Experiment Station Bulletin 624, "Cost of Producing and Marketing Rooted Cuttings.....", dated April 1983, available from most UT Extension offices or from author.

The Amendments
<u>When a good soil is present</u>
Beds can be constructed one at a time over a period of time as one decides on expanding; or many built at one time. Regardless, it is much easier and more

economical to treat the area as one unit and add amendments to the larger area than to individual beds, in my opinion.

Begin by soil testing the entire area where beds might be built in the next 1 to 3 years. Loosen the soil with a heavy disc or chisel plow. Broadcast any lime, phosphate and potash recommended by the soil test over the entire area. Spread 2-3 inches of 3/8" pine bark over the entire area. Incorporate everything with a tiller. Spread another 2-3 inches of pine bark and incorporate it. Do not add sand or peat moss. Peat moss will disappear too quickly. Stake the beds leaving 18 to 36 inches between the beds. Use string to mark the beds. Shovel the soil from the walkways into the future beds.

This puts the soil that was amended with nutrients and organic matter into the beds and raises the level to insure good drainage. Crown them as you go. (If timbers are used, string will not be required to mark the edges.) The beds should be higher than the walkways to prevent water from the walkways from entering the beds.

When a good soil is not present

I would still use amended soil, but bring in a good soil first; spread it out, mix it with the existing soil if possible, unless more than a foot is brought in; incorporate the pine bark; soil test; spread the recommended lime, P & K, etc.

Sand beds

I will not recommend pure sand beds. Roots are too brittle. One producer told me, “I learned sand bed grown cuttings do not survive good.”

The Mist System

Mist lines are normally 3/4" PVC pipe, with the mist head installed on vertical risers. Horizontal legs (18 to 24" lengths of pipe) are spaced occasionally to keep the risers vertical. The lines are fed with a washing machine fill hose. (These are well made, available, tight fitting couplings, strainers, etc. and the right length) It is very desirable for the line to be portable. One line can be used on more than one bed per season. Handle them with care. Let two people move them.

Deflection or whirling action nozzles are used. Different outputs are possible with different heads. Heads can be changed as rooting occurs to provide more water. Nozzles occasionally clog and lines sometimes break. Someone must check frequently. Newly stuck beds should be checked every 30 minutes to ensure all the beds are receiving mist.

Two time clocks are required. A 24 hour clock turns the system on and off in the morning and evening. The second turns the solenoids on and off for the duration of mist desired. More than one of these may be required when different durations are desired for different beds. Overhead electrical wires operate the solenoid valves that control the mist system.

There are some very good computerized control panels available. One of the best is used at the TSU-Nursery Research Center in McMinnville.

Supporting the poly and shade cloth
The standard practice is to cut concrete reinforcement wire into 6' lengths (should be 12 full squares). Make the cut with bolt cutters at the stay wire with no stubs. These form the bows that support the shade cloth and poly. They are placed end to end to form a tunnel; thus one name 'tunnel houses'. Many producers use fence staples to secure the wire to the timber. (Don't drive the staple in deep; it must be removed later.) The wire needs to be held in place and not disturb the poly when reaching in to work on nozzles from time to time.

Bows of PVC pipe and other types of flexible poly tubing, etc. can be placed every 3' to accomplish the same goal. The ends are slipped inside larger diameter pipe stakes driven into the ground.

Sanitation or Pest Control prior to use
Fumigate the beds prior to use. This kills most pathogens, insects, and weed seed except nutsedge and the hard coated types (vetch, clover, etc.). Methyl Bromide is no longer available. Basamid may be the best, presently. A handout is available.

The final step of preparation prior to sticking is to spread sand ¼ to ½" deep over the entire surface. Some reasons that cutting bed propagators share include: sand makes it easy to see where to stick cuttings; sand prevents the soil from crusting and eliminates the splashing of soil particles onto the foliage, keeping it cleaner for shipping, lighter in weight and possibly avoid possible pathogens. One experienced propagator likes to spread 1.5" sand for plants to root into first, then into the soil.

Propagators use a template to mark the sand where labor should stick cuttings for desired spacing. A 2x4, perhaps 4' long, will have 2" finishing nails (driven 1" deep) driven 1" apart on one of the 2" sides, resembling a comb. Other templates will have wider spacings. The 2x4 is dragged in both directions. Cuttings can be stuck where the lines intersect for a perfect spacing and a professional appearance.

***

A handout on "Seedbed Mgt." is available upon request.

Give a lot of thought to what you will produce; based on what you have the ability to produce and ability to sell. Availability of cuttings might be a problem with some plants. Be 110% sure of the name of the plant before sticking. Some experience working for a propagator would be invaluable before starting.

Comm/Propagation/Build prop beds