

# Pot-in-pot Nursery Production

## Introduction

Pot-in-pot involves the production of caliper-sized shade trees, flowering trees, and large shrubs in containers (production pots) which are placed inside permanent in-ground containers (socket pots). This method combines many of the benefits of field production with the marketing flexibility of container production. Some of the advantages of pot-in-pot over above-ground container production includes: root protection from the heat and cold, plants are more stable and not prone to tipping over, and plants can overwinter on-site. University of Kentucky experience with this system has been through research plots involving trees only.

## Marketing

Nursery crops may be marketed in a number of ways. **RETAILERS** produce and market directly to the homeowner. This type of business requires a retail outlet along with the on-site growing area and must be conveniently located for consumer access, generally near large urban areas. **WHOLESALE** produce plants that are sold to other nurserymen, landscapers, or retailers. **LANDSCAPE NURSERIES** produce plants for their own in-house landscaping service, but may have a retail outlet. Plants can be sold locally to a farmers market at retail prices.

## Market Outlook

Nationwide, the nursery business experienced steady growth



through 2006. The Kentucky wholesale nursery industry was a \$35.6 million dollar business in 2005 and had been expanding at a rate of 3 to 6 percent annually since 2000. Increases in housing starts and the growing number of hobby gardeners helped fuel this expansion. However, wholesale and retail nursery businesses are affected by new home construction, as well as overall economic health, and the nursery industry was hit hard by housing and economic slowdowns in 2008. Nursery producers will want to develop a business plan that takes into account the potential for a slowing economy and uncertain housing market such as that experienced in 2008.

## Production Considerations

### *Site selection*

Internal soil drainage is the primary consideration for pot-in-pot production. The drowning of plants when the socket pot fills with water is one of the most common reasons for system failure. Most Kentucky soils do not drain well and a drainage system will need to be installed under the socket pots.

A source of clean, pest-free water is another important consideration in selecting a suitable site. The ideal site will



have a slightly sloping topography for proper air drainage and offer water drainage to a pond or retention basin for recycling back to the crop.

### *Installation*

The socket pot and production pot need to be compatible units that are manufactured specifically for this purpose. The socket pot can be installed by the auger method if the soil is well-drained or by the trench method in poorly drained sites. In the latter case, drainage tiles are laid in the bottom of the trench, with socket pots placed directly over the tiles. Regardless of the excavation method, socket pots are permanently buried with the top rim of the pot extending somewhat above ground level. The production pot containing the tree or shrub in a customized soilless growing media is then set into the socket pot.

### *Maintenance*

Shade trees are often pruned in both winter and summer to ensure that a central leader is maintained and the shape of the head of the tree is in proportion to the trunk. Shrubs are pruned regularly to establish a height and density for the planned market. Plants grown for the landscape trade tend to require specialized pruning. Inexpensive plants for the discount trade may be allowed to grow looser and taller before pruning, thus enabling them to get to size quickly. Trees may need to be staked to maintain a straight trunk.

### *Pest management*

Landscape fabric may be placed over the entire production area to reduce weed pressure. Alternate methods of weed control include hand weeding, mowing, mechanical cultivation, mulching, and chemical methods. Insect and disease management requires integrated pest management (IPM) strategies, such as planting resistant cultivars, scouting, and following best management practices.

### *Harvest*

Pot-in-pot nursery crops can be quickly harvested any day of the year. The time it takes for plants

to reach a saleable size will vary depending on the type of plant and growing conditions. Pot-in-pot plants are generally sold as finished plants with all the characteristics expected in the market place: form, size, branching, and trunk size.

The length of time a plant can be grown in a container is limited. These nursery crops are generally rotated through production on a three year cycle. Once unsold plants outgrow their container, they will have to be repotted to a larger container or discarded.

### *Labor requirements*

The level of management for pot-in-pot is intermediate between the low demand of field production and the higher demand of container-grown plants. Labor is required for potting, pruning, weed control, staking, pesticide applications, and harvest. Approximate per tree labor requirements include 10 minutes for planting, 30 minutes for pruning, 30 minutes for maintenance, and 5 minutes for harvest.

## **Economic Considerations**

Beginning a nursery business requires a large capital investment, even if land does not need to be purchased. The greatest drawback of pot-in-pot production is its significantly higher initial expense compared with other production methods. The main expenses involved in establishing a pot-in-pot site include the drainage system, socket containers, irrigation system, and hole excavation. Other expenses common to the nursery industry include equipment, buildings, supplies, plant material, irrigation system, labor, utilities, insurance, licenses, and inspections. With the large overhead investment required, a pot-in-pot nursery will usually take 6 or more years to be economically profitable.

Despite the large start-up costs, overall return for pot-in-pot has been reported to be equal to or greater than conventional field or above-ground container production. A grower must be prepared to make substantial investments for several years before realizing any positive

returns. Pot-in-pot production is extremely sensitive to sale price. 2008 estimates indicate consistent sale prices below \$50 are financially risky for this production system. It can take 2 to 4 years of operation before significant returns can be expected and an additional 3 to 5 years before showing a profit. The nursery operator will need to be able to handle the cash flow ups and downs associated with seasonal sales.

Below are 2008 per acre budget estimates for pot-in-pot production (1,144 red maple trees per acre for Western Kentucky market)

ITEM	2008 ESTIMATES
Installation costs <sup>1</sup>	\$33,250
Planting costs <sup>2</sup>	\$21,992
Production costs <sup>3</sup>	\$18,423
Harvest costs <sup>4</sup>	\$7,087
Returns <sup>5</sup>	\$48,915

<sup>1</sup> Includes sockets, fabric, and irrigation system

<sup>2</sup> Includes liner, insert pot, labor, media, and stakes

<sup>3</sup> Includes pesticides, irrigation, and labor for 2 years

<sup>4</sup> Includes labor, etc

<sup>5</sup> Based on 1,087 trees marketed at \$45 per tree

## Selected Resources

- Marketing Your Nursery (University of Kentucky, 2008)  
<http://www.ca.uky.edu/HLA/Dunwell/marketingournursery.html>
- Nursery Crops Development Center (University of Kentucky)  
<http://www.ca.uky.edu/HLA/Dunwell/win1.html>
- Nursery Crop Production (University of Kentucky)  
<http://www.ca.uky.edu/HLA/Dunwell/Nlgetstart.html>

- Physical and Economic Requirements for Pot-in-pot Nursery production (University of Kentucky, 1996)  
<http://www.ca.uky.edu/HLA/Dunwell/PNPMCN.html>
- PNP Systems Across the USA (University of Kentucky) *Power Point presentation*  
[http://www.uky.edu/Ag/Horticulture/potinpot\\_files/frame.htm](http://www.uky.edu/Ag/Horticulture/potinpot_files/frame.htm)
- Pot-in-pot Nursery System Cash Flow Worksheet (University of Kentucky, 2009)  
[http://www.uky.edu/Ag/NewCrops/pot\\_n\\_pot\\_2009.xls](http://www.uky.edu/Ag/NewCrops/pot_n_pot_2009.xls)
- Pot-in-pot Nursery System Cash Flow Worksheet - Annual Sales Version (University of Kentucky, 2009)  
[http://www.uky.edu/Ag/newcrops/pot\\_n\\_pot\\_annualsales\\_May\\_2009.xls](http://www.uky.edu/Ag/newcrops/pot_n_pot_annualsales_May_2009.xls)
- Trees, Shrubs, Ground Covers and Vines Suitable for Kentucky Landscapes, HO-61 (University of Kentucky, 1997)  
<http://www.ca.uky.edu/agc/pubs/ho/ho61/ho61.pdf>
- Best Management Practices Guide for Producing Nursery Crops (Southern Nursery Association, Atlanta, 2007) *Order from The Kentucky Nursery and Landscape Association*  
[knla@mis.net](mailto:knla@mis.net)
- Nursery Crops Science Website (North Carolina State University)  
<http://www.ces.ncsu.edu/depts/hort/nursery/>
- The Pot-in-Pot Production System (University of Tennessee, 2003)  
<http://www.utextension.utk.edu/mtnpi/handouts/Pot-N-Pot.pdf>
- Sustainable Small-scale Nursery Production (ATTRA, 2008)  
<http://www.attra.ncat.org/attra-pub/PDF/nursery.pdf>
- Tennessee Commercial Nursery Production Information (University of Tennessee)  
<http://www.utextension.utk.edu/mtnpi/handouts.html>