

# STATUS AND OPERATING COSTS OF SELECTED, MUNICIPALLY-OWNED TREE NURSERIES IN THE NORTHEAST UNITED STATES<sup>1</sup>

by Robert L. Tate

**Abstract.** A 1983 survey of 13 municipally-owned street and shade tree nurseries in the Northeast United States determined that the average nursery was slightly larger than 2 acres, contained 830 trees and had been in existence 20 years. Tree stock for municipal nurseries was obtained by direct purchase from commercial nurseries and is grown in the nursery for an average of 3 years before outplanting as a 1½-1¾ inch diameter street tree. The average initial purchase price of a bare-root tree was \$12.50, cost \$.80 to plant it, \$3.40 to maintain it each year and \$4.80 to lift and prepare it for planting. The type and level of nursery maintenance varied by community.

Municipalities expend considerable sums of time and money to operate shade and street tree nurseries. According to a study by Giedraitis and Kielbaso (1982), 22 percent of the cities responding operated a nursery and allocated an average of 1 percent of their tree care budget to it. The reasons for operating a nursery may be based on economic factors, the need to assure adequate supplies of a desirable species and size, political motivations, or because of widely fluctuating yearly tree care budgets (Tate 1977, Giedraitis and Kielbaso 1982). Even though many communities have nurseries, the need for more information about growing vs. purchasing trees for street planting has been consistently ranked highly (Ottman and Kielbaso 1976).

In an examination of the Ann Arbor, Michigan municipal tree nursery, Tate (1977) reported that it appeared to be less expensive to grow trees than to purchase them from commercial nurseries, however the savings from this may be offset by losing the ability to provide other more critical tree maintenance activities. A combination of growing and purchasing plantable-sized trees was recommended.

This study was initiated to investigate the costs of operating municipally-owned shade and street tree bare-root nurseries in the Northeast United States. Information from the study can be used by urban tree managers as a basis for comparison in making a nursery related decision to establish, to continue or to discontinue operations. Initial contact was made by telephone in 1983 with a stratified random sample of 233 municipalities in seven northeastern states.

Of the municipalities sampled, 24 (10.3 percent) reported the existence of a nursery. Eighteen were visited and the person responsible for the management of the nursery was interviewed. Only 13 (72 percent) had information in sufficient detail for use in this study.

The average nursery in this study was slightly larger than 2 acres, contained 830 trees of various species and sizes and had been in existence for 20 years. It received a yearly allocation of just under 3 percent of the municipal tree maintenance budget. Nearly 4 percent of the time allocated to annual tree maintenance was spent on it (Table 1).

Tree stock for municipal nurseries is primarily obtained by direct purchase from various commercial nurseries in the region. The communities surveyed buy all or most (more than 75 percent) of their stock from these sources. While they are generally satisfied with this arrangement, some problems with availability, size, and delivery are encountered. Two of the cities collect a portion of their stock from the wild and one grows a small percentage of it from seed.

The average size range of bare-root trees purchased from commercial nurseries is ¾-1 inch in diameter. Trees are grown in the nursery until they reach the desired size (on the average,

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1½-1¾ inches in diameter) for street planting.

Depending on the species, size, growing conditions, and maintenance practices, trees are held in the nursery for an average of 3 years before they are lifted, bare-rooted and planted. Occasionally trees are held for longer periods to allow them to attain a larger size suitable for special planting situations. Several respondents noted that trees are transplanted from their respective nurseries before they have reached what they consider to be an optimum size for bare-root street tree planting. These situations generally occur when the demand for street trees is great and funds are not available or insufficient to purchase enough to satisfy demand.

The reported 1980 price of a bare-root tree in this study, ¾-1 inch in diameter (6-8 feet, branched), purchased from a commercial nursery and delivered to the nursery site averaged \$12.50. On the average, it cost \$.80 to initially plant it in the nursery, required \$3.40 to maintain it each year and \$4.80 to lift and prepare it for street planting.

Cities practice differing types and levels of nursery maintenance. All of them prune to direct growth, shape the crown, and to offset root loss. Most fertilize initially during planting, spray to control insects and diseases, water during drought periods, and stake trees when they begin to lean or are loose in the soil.

Nursery tree mortality ranged widely from zero to as much as one-third of the trees per year. On the average it amounted to 6 percent per year and was reported to be chiefly caused by transplant shock, drought and vandalism.

Over one-half (54 percent) of the communities in this study used their nurseries to supply at least 50 percent of their street tree planting needs but had no plans to increase nursery production significantly because their additional needs are generally satisfied by commercial nurseries. Only three cities obtained all of their street trees from their own nurseries.

Communities plant in their nurseries a variety of tree species (Table 2) which are readily available, relatively inexpensive, easily grown and are popular street trees. The respondents did not indicate a major change in the types of trees they anticipated planting in the near future.

Table 3 illustrates the average production cost per tree calculated from purchase, planting, maintenance, and lifting costs. An average mortality rate of 6 percent per year is used in the calculations. In this study, approximately 60 percent of the cost of producing a bare-root street tree is related to planting, growing and lifting it. After purchase price, the largest individual factor (33.4 percent) in the operation of a nursery is the maintenance given to the tree during its growing period of 3 years. Lifting costs are an important

**Table 1. Size, age, tree inventory, and budget allocation of nurseries (13 cities).**

<i>Category</i>	<i>Minimum</i>	<i>Mean</i>	<i>Maximum</i>
City size (population)	23,000	53,000	175,000
Annual Tree care budget (dollars)	20,000	198,000	1,000,000
Nursery			
Size (acres)	◀1.0	2.2	6.0
Inventory (trees)	200	830	4,000
Age (years)	3	20	50
Annual maintenance budget (dollars)*	1,300	5,500	12,000
Annual percentage of tree division— time spent on nursery operation	1.0	3.8	7.0
Annual percentage of municipal budget spent on nursery operations	0.1	2.8	6.5

\* Costs and time allocations refer to bare-root trees only.

**Table 2. Type of deciduous trees grown in nurseries (13 cities).**

Type	% of nurseries planting
Maple	100
Ornamental pear	85
Oak	62
Littleleaf linden	46
Ornamental cherry	46
Flowering crabapple	38
Zelkova	38
Sweetgum, Ash and Honeylocust	31

**Table 3. Nursery bare-root tree production costs (13 cities).**

Category	Cost	
	\$	%
Purchase price	12.50	40.9
Mortality factor	2.25	7.4
Planting cost	.80	2.6
Maintenance cost (3 years)	10.20	33.4
Lifting cost	4.80	15.7
Total	30.55	100.0

consideration as they amount to nearly 16 percent of the total cost.

The two largest factors associated with operating municipally-owned nurseries are purchasing and maintaining their trees. Mortality and growth rates of a particular species in a nursery are related to the level of maintenance provided. Therefore increasing yearly maintenance levels to reduce mortality and to increase growth shortening the length of time trees are in the nursery reduces the overall maintenance cost.

Reducing the initial purchase price is another important consideration since it is the largest single cost associated with a nursery. Careful

regard for the reasons a tree is purchased at a particular size for planting in the nursery is important. Are 6-8 feet branched stock purchased because smaller trees are subject to greater initial planting mortality? Are they purchased because they require too much time to reach the desired size for outplanting? Are smaller sizes available and if so is the cost significantly lower? If mortality and growth rates are the reasons, attention to careful handling, proper planting technique and higher levels of maintenance can reduce mortality and may shorten the rotation period.

Costs do not alone determine the value of municipal tree nurseries and other factors will continue to play an important part in the decision to establish and operate them. Because of this, there has been no attempt in this study to compare the cost of producing municipally-grown nursery trees to those produced by commercial nurseries. This can be done on an individual nursery basis using the methodology developed here to compare per tree costs to local nursery prices for the same size and species.

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