

METRIA PROJECTS ON SPECIES TRIALS AND CULTIVAR TESTING¹

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Abstract. The Metropolitan Tree Improvement Alliance (METRIA), an informal association of nurserymen, municipal and highway arborists, landscape planners, tree breeders and others interested in growing trees in urban areas, has initiated two projects aimed at gathering information about the suitability and urban hardiness of trees planted in urban areas. The "Species Trials Project" is aimed at stimulating trials of little-used species that show promise for wider use in urban plantings. The second project, a "Cultivar Testing Project," is directed toward collecting and analyzing information regarding the performance of cultivars currently available for planting in urban areas. This paper describes the evolution of these two projects and the cooperative efforts that are needed.

Trees have long been highly desirable components of cities and communities. Unfortunately, there are still many questions regarding the selection and maintenance of trees in urban areas. Trees growing in the less-than-optimal conditions of the urban environment face numerous stress factors. Perry (1978) estimated that trees along streets in urban areas of the eastern United States have a life expectancy of less than 20 years. While there are some exceptions, such as the devastation caused by Dutch elm disease, most tree problems that limit survival are syndromes involving interactions of many stress factors (Rice, 1976; Van Arsdel, 1979).

Information on the ability of trees to cope with the broad spectrum of environmental stresses is needed by landscape planners, municipal arborists, and others for selecting tree species and cultivars (cultivated varieties) to be planted in cities. There are presently hundreds of tree species and cultivars available, but there is a need to generate better information on the comparative survival, cold hardiness, growth rate, and desirability of these trees in urban conditions (Karnosky, 1981). This information needs to be summarized by regions of the country because the

best trees in one region may not be suitable for another region.

The Metropolitan Tree Improvement Alliance (METRIA) was begun in 1973 to bring together nurserymen, municipal and highway arborists, landscape planners, tree breeders and other specialists to work together toward developing better trees and better techniques for managing them (Gerhold, 1978). The early years of METRIA's development were primarily devoted to presenting information as to what was known about selecting and maintaining urban trees. In this regard, a symposium, "Better Trees for Metropolitan Landscapes," was held in 1975, followed by technical conferences in 1976, 1979 ("Little Known Species"), and 1980 ("Urban Trees and Their Soils").

Among the concepts for research that consistently surfaced during these meetings were: 1) the need to stimulate trials of little-used species to determine which ones have the most promise for wider use in urban plantings; and 2) the need to have a coordinated program to collect and analyze information on the performance of cultivars available for planting in urban areas. These two concepts have evolved into two METRIA projects: a "Species Trials Project" and a "Cultivar Testing Project." The remainder of this paper will describe these two projects and outline plans for cooperative efforts among researchers, planners, arborists, and nurserymen.

Species Trials

In our cultivar-oriented plant world, we tend to overlook the fact that genetic diversification within and among species is necessary to ensure stable urban plant communities. Species diversification

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also serves as an important source of single plant selections for release as cultivars. Therefore, METRIA members are justified in maintaining their strong interests in tree species grown from seed, many of which are little-used and insufficiently tested.

Species testing may allow for a wider range of genotypes to be examined and used than are presently available as cultivars. This is particularly important for two reasons. First, seedling populations in a species test may yield individual trees or families that are better adapted to climatic conditions at a given site than are the present cultivars. Second, because most cultivars selected to date have been chosen for their ornamental value and not for their urban hardiness, there is the need to screen diverse populations in species tests and to select trees tolerant of the many environmental stresses affecting urban trees. Beyond these reasons, there is also the anticipation that some little-used species may yield some unique and highly desirable plants when they are tested more widely. This is particularly true with species for which only a limited number of plant selections have been cultivated outside their native ranges (e.g., many trees native to China).

The METRIA Species Trials Project is attempting to develop comprehensive knowledge about each species to be tested. The project is headed by William Collins, appointed to a three-year term, and it is organized by species so that the expertise of those who have strong interests in a particular species can be used most effectively. For each species, a committee will be established to stimulate and monitor trials of that species over as wide an area as possible. Committee chairmen will meet periodically with the project leader to plan trials, standardize methods, and disseminate results. Work to date on this project has focused on choosing species and organizing the species committees. The committees will be responsible for reviewing existing knowledge about the species, seeking desirable sources of seed or vegetative propagules, developing trial plantings, reporting their progress, and eventually in introducing new plants into the nursery trade.

Discussions and questionnaires designed to focus the Special Trials Project on a few priority species have consistently pointed out the need to

test a large number of species. Attempts are now being made to initiate research efforts on those species for which programs can be most readily developed. Although it is still in its infancy, this project offers unique opportunities for cooperation among researchers, arborists, and nurserymen.

Cultivar Testing

The testing of cultivars on a variety of urban sites can assist landscape tree managers with one of their most important and challenging tasks, that is, selecting the best tree for a particular site. This is difficult because of uncertainties in predicting which of the candidates is best suited (i.e., which can best withstand stresses caused by environmental insults, remain healthy the longest, and require the least maintenance?). Such decisions ideally should be based on comparative data from performance tests of all available cultivars, covering the whole range of site conditions to which they are adapted. Because the genetic



Figure 1. The Amur cork tree (*Phellodendron amurense*) is an example of a little-used species that shows good promise for increased use in urban plantings. (Amfac Nurseries Cole Photo.)



Figure 2. This upright European hornbeam (*Carpinus betulus* 'Fastigiata'), commonly grown in Europe, is an example of the many cultivars that need to be more thoroughly tested in urban areas of the United State. (Am-lac Nurseries Cole Photo.)

makeup of cultivars (most are vegetatively propagated) generally is very stable, their performance can be predicted with great precision and reliability, provided sufficient background information is available.

The METRIA Cultivar Testing Project is a cooperative program to be conducted by many city tree and highway departments that will put out test plantings annually, with guidance from state urban forestry agencies, and coordinated by METRIA. Trees for test plantings are purchased through normal channels from cooperating nurseries, which are asked to mark the identity of each and provide background data. Test trees are part of an agency's regular plantings, and are measured periodically to obtain data on survival, size, health, and maintenance needs. An alter-

native or supplement to new test plantings is to obtain data from existing plantings whose identity and planting date are known. Analytical services for evaluating test results will require a long-term financial commitment; this function could be carried out by state agencies or by METRIA.

METRIA began organizing the Cultivar Testing Project in 1980, when the idea was approved. The project leader, Henry Gerhold, was appointed for a three-year term to coordinate the work. Three regional committee chairmen have been appointed to stimulate and monitor testing and evaluations. David Karnosky is Chairman of Northeast Region, extending from New England, Quebec, and Ontario to West Virginia, Maryland and Delaware. Davis Sydnor is Chairman of the Southeast Region, which includes all states southward from Virginia and Kentucky and westward to Arkansas, Oklahoma, and Texas. George Ware is Chairman of the Midwest Region which extends from Ohio west to Missouri and Iowa and from Michigan to Minnesota. It is anticipated that West, Southwest, and Northwest Regions can be established when warranted by a sufficient number of cooperators. The regional chairmen meet periodically with the project leader to recommend testing procedures and cultivars to be tested, to review progress in testing and evaluation, and to arrange for publication of results.

Regional committees currently are being formed with representatives of agencies involved in testing. Their responsibilities are to:

1. Contact agencies that may be interested in cultivar testing (e.g., state agencies, university departments of forestry or horticulture, Cooperative Extension Service), to publicize testing opportunities and offer technical advice.
2. Coordinate various testing programs by suggesting standardized methods and by recommending cultivars to be tested so that comparison of results among geographic regions are possible.
3. Maintain lists of cultivars being tested, specifying geographic location, cooperator, date, and testing method.
4. Monitor progress in establishing tests and reporting of results, and publicize availability of reports via THE METRIAN newsletter and

other outlets.

Persons who are interested in participating may contact the project leader or any of the chairmen. It is hoped that state urban forestry agencies will take the initiative in recruiting participants and providing training in test methods with assistance from METRIA. A manual for cooperators is available, including data forms with instructions (Sacksteder and Gerhold, 1979).

Future Work

The conceptual groundwork for the two METRIA projects has been developed. The next step has been to publicize the projects so that the necessary cooperators are alerted to these two projects. Following formal presentations of these two projects at the International Society of Arboriculture meeting at Boyne Falls, Michigan, discussion sessions were particularly useful in getting input from municipal arborists who expressed an interest in these projects. Because of the complexity of these two projects, which are multidisciplinary and involve many different institutions, organizations, and agencies, some time has been required to lay the groundwork. When field work is initiated, it is expected that greater momentum can be sustained. With this in mind,

METRIA is attempting to generate support to get these projects over the planning stage and into the testing phase.

Persons who are interested in participating in these projects are encouraged to contact the authors.

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ABSTRACT

Chapman, Douglas J. 1982. **Timing and methods for landscape trees**. Weeds, Trees & Turf 21(3): 66, 68.

Fertilization of trees is one of the key practices for grounds management. Timing and method of application are paramount in tree culture. The punch-bar method is effective in providing plant nutrients to the tree but often causes damage to the lawn and unsightly holes in the sod and damages some roots. Some recommend the application of foliar fertilizers. Some absorption does occur through the leaf but maximum absorption of fertilizer is from the soil by the roots. The third and best method of applying fertilizer is the application to the soil surface of fertilizer prior to growth starting in the spring. The rate is three to five pounds of actual nitrogen per 1,000 square feet on soil surface under the canopy of the tree. This recommendation is valid for large and small trees. Pragmatically speaking, unless some unique condition exists, probably most maintenance superintendents could apply a lawn fertilizer, such as 18-4-12 at two to three times the recommended turf rate early in the spring prior to the commencement of growth with the result — healthy, vigorous trees.