

HOUSEHOLDER EVALUATION OF TWO STREET TREE SPECIES

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Abstract. A technique is described for evaluating householder responses to street trees in front of their homes. Evaluations of the European elm and London plane are presented. As a complement to stimulation studies, evaluation can produce new and useful information for tree agencies and arborists in guiding planting and maintenance programs.

Key words: street tree, tree commission, tree maintenance, evaluation.

Résumé. Une technique est décrite afin d'évaluer l'appréciation des propriétaires quant aux arbres de rues situés devant leur propriété. Les évaluations de l'orme européen et de l'érable de Norvège sont présentées. Ces évaluations peuvent servir de complément aux études de simulation, en offrant des informations nouvelles et utiles aux arboriculteurs et aux services municipaux pour orienter les programmes de plantation et d'entretien des arbres.

The benefits of street trees have been described in environmental, economic, and psychological terms (5,7,9,10). However, street trees are not without problems. Some of the annoyances that can be associated with street trees are raised sidewalks, broken curbs, plugged sewer lines, broken gas and water pipes, insect infestation, blocked views and solar access, reduced visibility in high-crime neighborhoods, obstruction of power lines, and the costs associated with planting and maintenance. Nursery operators and tree maintenance personnel represent valuable sources of information about these problems (3,8). However, it is risky to view the absence of maintenance problems as a positive evaluation of a tree. A species that draws no complaints from professionals may at the same time draw no praise from city dwellers.

According to Brush and Moore (4) the chief research question for behavioral scientists interested in the place of nature in the city is to find out what attributes of city vegetation urban residents consider to be desirable. A favorite behavioral research method for studying urban forestry has been photographic simulation, often

traced to the work of Shafer and Richards (11), which has demonstrated the positive effects of the presence of street trees on viewers' perceptions of urban scenes (1,2,12).

While the information from photograph simulation has been important in documenting the advantages of street trees in general, the approach provides little guidance as to the most suitable species for particular locations. Nor does it differentiate between spectators who view trees from a distance and people who experience a tree on a daily basis. *Evaluation* of a resident satisfaction using survey procedures provides an alternative model for assessing the opinions of street trees held by city residents who experience the tangible reality of street trees as a multi-sensory, changing aspect in specific settings.

The present study explores attitudes toward the particular street tree in front of each respondent's residence. The working assumptions of the present study are that collected tabulations of the direct experience of householders with specific street trees contribute to an understanding of tree benefits and liabilities and that such evaluation can provide valuable, often new, information for city tree agencies to help guide planting and maintenance programs.

Procedure

Based on discussions with the Parks and Recreation Department in Sacramento, CA, two trees were selected for mail surveys: European elm (*Ulmus procera*) and London planetree (*Platanus acerifolia*). The elm was selected because of the controversy surrounding the elm leaf beetle. Numerous complaints had been made to the city regarding the mess generated by these beetles. The intensity of these views had led the city to begin removing elms from the downtown

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area. Opposition from tree lovers quickly terminated the removal program, leading to a stalemate. It was hoped that the survey, by identifying the opinions of those individuals most directly affected by the elms would help the city resolve the controversy.

The London planetree was selected as another mature tree in the downtown area that would offer comparative data for the elm evaluation, as well as guidance about the good and bad features of this second species as a street tree. The Parks and Recreation Department supplied information on neighborhoods containing the two species. The researchers visited the neighborhoods to locate residences associated with a target tree. From the pool of addresses, a random sample of households was generated for each target tree. For the elm, there were 133 addresses and for the planetree, 196 addresses. Based on the earlier research by Getz, Karow, & Kielbaso (6) and our own pilot studies, a multiple-choice questionnaire was constructed and pre-tested. This instrument was printed on both sides of an 11" x 17" sheet and folded in the center to make a four-page questionnaire. Half the sample by random selection received the material (cover letter, questionnaire, and return stamped envelope) in an envelope with a personal address, while the remainder received the material in a envelope addressed to "resident."

Results

Of the 133 surveys sent out on the European elm, 96 were returned in time for analysis, for a return rate of 72 percent. For the 196 planetree surveys, 108 were returned in time for analysis, for a return rate of 55 percent. There was no difference in return rate for surveys addressed with a personal name and those sent to "resident."

European elm. Table 1 shows that the major benefits of the elm were shade and visual aesthetics. The elm was at the top of the list (including several other trees used in the pilot study to develop the survey procedure) in both these characteristics. The most annoying features were insects in the tree, disease, and dropping sap. Responses to the open-end question dealt largely with the leaf beetle droppings.

A composite score was computed for each

respondent by summing the mean of the benefit scores and subtracting the mean of the annoyances. This was called the Global Evaluation which could vary from -3 (totally negative with no benefits) to +3 (totally positive without any annoyances). The actual range of the elm ratings extended from -1.7 to 2.8 with a median evaluation of .81 and a mean evaluation of .88 (Table 1). The positive features of the elm tree clearly offset negative features among these householders. For most respondents the benefits were considered major, while the annoyances were in the moderate to minor range.

Respondents were asked for their overall opinion of the tree, whether they would like to see the tree removed and replaced with another, whether they would have preferred the city to plant a different tree in the first place, and if the growth rate for the tree were satisfactory. On the overall evaluation, positive opinions outweighed

Table 1. Perceived benefits and annoyances of elm and planetree.

Trail	Elm	Plane
	N=96	N=108
	Mean rating *	
Benefit		
gives shade	3.8	3.7
pleasing to the eye	3.6	3.6
marks change in seasons	2.9	2.8
slows wind speed	2.7	2.3
increases privacy	2.6	2.1
reduces noise	2.6	2.3
increases property values	2.4	3.1
fall color	2.4	2.4
flowers on tree	1.4	1.2
Annoyance		
insects in tree	2.8	1.5
diseases on tree	2.5	1.8
fallen leaves in autumn	2.4	2.6
sap drips	2.4	1.4
falling limbs	2.3	2.3
leaves fall continuously in summer	2.2	2.0
roots too close to surface	2.0	2.0
sidewalk damaged by roots	2.0	2.0
causes allergies	1.6	1.6
branches and suckers at base	1.6	1.2
fruit or seed pods fall	1.5	1.7
roots clog sewers	1.5	1.3
roots send up suckers	1.5	1.2
flower parts fall	1.3	1.2
mistletoe	1.2	1.3
makes street dark	1.3	1.2
blocks view	1.2	1.1
reduces personal security	1.2	1.1

*Rated on a 4-point scale from major(4), moderate (3), minor (2), to no benefit or does not apply (1).

negative ones by a ratio exceeding 3:1. Further support of this positive evaluation appears when respondents were asked whether they would like to see the tree removed and replaced with another. About a quarter of the respondents answered affirmatively, 17 percent were undecided, while 59 percent would not want to see the tree removed.

London planetree. Table 1 shows that the major benefits of the tree are shade, visual aesthetics, and increased property values. Several of the open-ended responses mentioned improvement to the neighborhood and the increased sense of community created by these large, stately trees. Few major or moderate problems are associated with the tree. The largest source of annoyance was fallen leaves in autumn, but this was halfway between moderate and a minor annoyance. Fallen limbs and surface roots were minor problems. The Global Evaluation (weighted sum of benefits and annoyances) of 1.04 is clearly in the positive direction.

Overall rating of the tree was also very positive with only 7 percent of the respondents rating it poor, compared to 90 percent rating it from good to excellent. Opinions were similarly weighted against removing the tree (85% against, 7% for and 8% undecided) and replacing it with another (63% against, 24% for, and 13% undecided). Growth rate was considered satisfactory.

Demographics and comments. Table 2 shows that the sample for the elm contains a preponderance of males, renters, whites, is varied in income, has a modal age in the thirties, and has lived at the present residence an average of 10.6 years. The sample for the plane tree was overwhelmingly homeowners, equally divided as to gender, mostly white, varied in income, with a modal age in the sixties, and has lived in the present residence an average of 17 years. Opinions for the two trees did not relate to any demographic variable except for age. Older householders had a lower opinion of both trees than did younger residents. This relationship held up when length of residence was taken into account.

A majority of respondents provided additional comments at the end of the questionnaire. These statements were overwhelmingly positive, and

can be most succinctly described by quoting one of them, "A city without trees is a day without sun." People emphasized the contribution made by the trees to the neighborhood, to community life, city character, and to property values. Several people remarked that the presence of these mature trees was an important factor in their selection of the neighborhood, e.g., "The beauty of the trees in the neighborhood was a primary consideration when purchasing our home. We would not be living here without them," and "Trees make Sacramento special!"

Discussion

Consistent with the results of simulation studies, visual aesthetics and shade are important attributes of street trees, but they are far from the major or sole determinant of householder opinions. Each species has an individual ledger of benefits and liabilities. Numerous householders

Table 2. Demographic attributes of respondents

Attribute	Percent	
	Elm	Plane
owner	37	93
renter	62	4
male	55	48
female	43	46
Anglo	89	94
Black	0	0
Asian	1	4
Hispanic	5	0
other	1	0
Household income		
◀\$10,000	5	3
\$10-19,999	18	9
\$20-29,999	15	12
\$30-39,999	9	13
\$40-49,999	6	9
\$50,000+	23	24
Length of residence (yrs)		
0-5	52	31
5.1-10	16	7
10.1-15	8	17
15.1-20	7	7
▶20	17	37
Respondent age (yrs)		
20-29	14	1
30-39	46	24
40-49	15	22
50-59	8	13
60+	16	38

*Totals are not 100% due to missing values.

with the same tree in the front yard making similar statements provide a basis for believing the findings to have some generality. Nonetheless, it would be risky to generalize without qualification from ratings obtained in one community to other cities with different climatic or socio-cultural conditions.

Evaluation can serve as an antidote to the squeaky wheel phenomenon in householder complaints. The mature elms in the survey were the subject of intense controversy between those residents who demanded their removal because of the insect infestation and tree advocates who felt that the infestation was a minor problem relative to the attractiveness of these stately trees. The city agency was caught in the middle without clear knowledge as to the extent and intensity of complaints among the affected residents. The present results show that householders are not unanimous in demanding the removal of the elms. Most, in fact, like their stately elms and do *not* want to see them removed. This information has been very useful to the city tree agency in deciding what to do about these trees.

During the interviews and on the written questionnaires, several respondents spontaneously requested more information about "their tree." They were troubled when they saw an apparent problem without any explanation or indication that the city was aware of the situation. Tree agencies might consider ways of providing additional information by working through established organizations such as garden clubs, civic improvement groups or environmental organizations. Educational materials that increase public understanding, especially in regard to potentially controversial issues such as spraying, trimming, and tree removal, should be considered as low-cost extensions of existing programs. There is a large constituency of street tree advocates among householders that can be mobilized in support of adequate maintenance levels.

Major benefits that can be expected to accrue from an application of evaluation procedures to street trees are as follows:

1. Cities can assess residents' perceptions concerning various species as a basis of continuing to keep or replace trees that have reached stagnation or declining conditions and as a basis

for continuing to plant species determined from the survey to be well-liked and comparatively trouble-free to householders.

2. Nurseries which have access to the results of householder evaluations can orient their inventory and sales efforts toward the kind of trees most satisfying to householders.

3. Researchers involved in the genetic improvement of urban trees can identify traits of particular species in need of modification in the interest of providing householders with trees that will be most satisfying to them.

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Literature Cited

1. Anderson, L.M. and H.W. Schroeder. 1983. *Application of wildlife scenic assessment methods to the urban landscape*. Landscape Planning 10:219-237.
2. Aoki, Y. 1975. A study on the method of measurement of green environment in residential areas. Papers of the 10th Scientific Research Meeting, City Planning Institute of Japan, pp. 163-168.
3. Barker, P.A. 1983. Some urban trees of California: Maintenance problems and genetic improvement possibilities. In: Gerhold, Henry D. Proceedings of the fourth biennial conference of the Metropolitan Tree Improvement Alliance. University Park, PA: Pennsylvania State University School of Forest Resources; 1983:47-54.
4. Brush, R.O., and T.A. Moore. 1976. Some psychological and social aspects of trees in the city. In: Santamour, F.S. et. al., Eds. *Better Trees for Metropolitan Landscapes*. Technical report NE. 22, Forest Service, USDA, 25-28.
5. Dwyer, J.F. 1985. The economic value of urban plants. Proceedings of the First International Symposium on Urban Horticulture. (D.F. Karnosky and S.L. Karnosky, eds.) New York Botanical Garden Institute of Urban Horticulture Publications Number 2, pp. 15-27.
6. Getz, D.A., A. Karnow, and J.J. Kielbaso. 1982. *Inner city preferences for trees and urban forestry programs*. J. Arboric. 8:258-263.
7. Grey, G.W. and F.J. Deneke. 1986. *Urban Forestry* (2nd edition). Wiley, New York.
8. Legg, M.H. and R.R. Hicks. 1976. Public decision making in selecting trees for human settlements. In: Andresen, J.W. ed. *Trees and Forests for Human Settlements*. Center for Urban Forestry Studies, Univ. of Toronto, Canada, pp. 275-285.
9. Payne, B.R. 1973. *The 29-tree home improvement plan*. Natural History, 82:74-75.
10. Schroeder, H.W. and W.N. Cannon. 1983. *The esthetic contribution of trees to residential streets in Ohio towns*. J. Arboric. 9:237-243.
11. Shafer, E.L. and T. Richards. 1974. A comparison of viewer reactions to outdoor scenes and photographs of

those scenes. USDA Forest Service Research Paper NE-302. Northeast Forest Experiment Station, Upper Darby, PA.

12. Ulrich, R.S. 1986. *Human response to vegetation and landscapes*. *Landscape and Urban Planning*, 13:29-44.

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Abstract

BLESSING, S.C. and M.N. DANA. 1988. **Root system expansion after transplanting**. *Am. Nurseryman* 167(5):117.

We examined the performance of *Juniperus chinensis* "Sea Green" to characterize and evaluate post-transplant root system expansion of B&B and container-grown plants in different soil types. We also evaluated the effects of mechanical root ball disruption on root and shoot growth of container-grown plants. Container-grown plants had significantly greater root dry weight than did disrupted container-grown plants; root ball disruption appeared to be detrimental in the heavy silty clay soil. Our results suggest that nurserymen should not indiscriminately apply the practice of mechanical disruption of container-grown root balls before transplanting.

CORLEY, W.L., L.L. GOODROAD and C.D. ROBACKER. 1988. **Initial growth response to landscape fertilizers**. *Am. Nurseryman* 167(5):117-118.

We tested the efficacy of five fertilizers on first-year growth of four trees typical of urban landscapes: white, or flowering, dogwood; red maple; Chinese pistache; and sycamore. The fertilizer treatments included surface application of granular 16-4-8, surface drench of liquid 12-4-4, incorporated 20-10-5 Agriform tablets (slow release), incorporated 17-7-12 Osmocote (slow-release), and incorporated 14-3-3 Woodace briquettes (slow-release). We obtained plant-growth data and leaf analyses after the first growing season. There were few significant growth increases. Analysis of leaf samples showed no definite growth response patterns as affected by species, fertilizer formulation or an interaction of the two.

PANCOAST, D.A. 1988. **Consulting becomes a bigger part of arboriculture**. *Arbor Age* 8(3):22-23.

Today, more and more arborists do consulting as part of their normal operations. Environmental and regulatory concerns have changed the way in which the profession is practiced. More time is spent inspecting rather than treating. Until very recently, consulting arborists were called into cases only when legal action was taken, whether in the form of an income-tax casualty-loss deduction, insurance claim, condemnation or other proceeding. Today, consulting arborists do much more. Consulting arborists are being retained by property owners, municipalities, utilities, and forward-thinking builders to consult with them on the preservation of mature trees on wooded lots during construction. They also are developing and supervising the implementation of tree inventories and tree-management problems for municipalities, industry, recreational facilities, and estate owners.