

PLANTING FREQUENCIES AND TRENDS OF STREET TREES IN SOUTHERN ONTARIO MUNICIPALITIES

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Abstract. Traditionally, municipalities have relied upon a rather narrow range of species for their planting programs. A survey of 23 municipalities in southern Ontario indicates that upwards of 90% of all street trees planted during the 1970's comprised six species and their cultivars. Trends in the use of individual species have shown changes during the same period. Urban forest managers must be careful not to sacrifice short term gains for long term management difficulties through reduced species diversity.

The need to provide adequate diversity of tree species in our urban areas has been echoed many times (1, 2, 4, 3). While today's urban forests are probably more diverse than they were fifty years ago, a number of factors are contributing to a reduction in the variety of planting taking place in many cities and towns. These include: 1) an over-reliance by urban forest managers on a rather narrow group of "successful" cultivars of a few main species; 2) a low diversity of tree material being grown by the nurseries due to economic, biological and ecological constraints; 3) sporadic and insufficiently coordinated shade tree selection efforts in many areas; and 4) declining budgets for urban forestry planting programs (2, 4).

The purpose of this study is to investigate the composition of street tree plantings of selected municipalities in southern Ontario over the period 1971 to 1980. Specifically, it is intended to record tree species planting frequencies and to illustrate trends in their use within the decade.

Study Method

Questionnaires were sent in February 1981 to twenty-three municipalities in south central and southwestern Ontario (Table 1). These communities were selected because they had an active urban forestry program which involved the development of new residential and commercial areas as opposed to a large proportion of redevelopment and infill projects. The study was confined to the south central and southwestern portions of the province to align similarities in

climate and site conditions.

Each municipality was asked to provide data on the total number of street trees planted annually, by species, over the period of 1971 to 1980. The resultant data were reviewed and, where appropriate, combined to give composite figures on the frequency of use of individual species over time. Species trends could then be discerned from the frequency/time data.

Results

Of the 23 municipalities contacted, 21 replies were received (91%). Sixteen of the 21 responding municipalities (76%) were able to provide street tree planting data in some form. However, only 5 of the 21 responses (24%) contained data that were comparable over the 10-year period 1971-1980, while 10 of 21 responses (48%) provided data that were comparable over a 5-year period from 1976-1980. It was apparent from the information received that few municipalities could provide accurate long-term historical data on the total number of individual species planted on an annual basis within the city or town.

Figures 1 and 2 illustrate the trends in planting of the six most popular species (as represented by percentage of total annual plantings) for the 10-year and 5-year periods respectively. Tables 2 and 3 show the aggregate percentages of total annual plantings for the same six species over the 10-year and 5-year periods.

Discussion

The cumulative data presented in Tables 2 and 3 illustrate an obvious dependency by municipalities on a narrow range of species for street tree planting. For the period 1981-1980, 89.6% of all trees planted on average comprised six species and their cultivars.

Trends for individual species show quite clearly that Norway maple (*Acer platanoides*) is dominant. It is widely recognized to have a good survival

Table 1. List of municipalities contacted for street tree planting frequency data.

Name of Municipality	Area (ha.) ¹	Population ¹
Barrie	2,896	38,011
Brampton	27,039	140,649
Brantford	5,154	73,055
Burlington	18,907	122,722
Cambridge	11,257	75,716
Etobicoke	12,709	292,045
Guelph	6,871	73,165
Hamilton	12,222	306,640
Kitchener	13,350	138,271
London	16,219	261,841
Markham	20,590	73,063
Mississauga	29,344	298,045
Niagara Falls	20,447	70,775
North York	17,985	560,280
Oakville	14,245	73,603
Oshawa	14,211	115,486
Peterborough	5,322	61,241
Richmond Hill	9,764	36,599
Sarnia	3,010	49,764
Scarborough	18,737	427,503
St. Catharines	9,628	123,617
Waterloo	6,605	54,157
Windsor	11,976	196,512

¹Source: Municipal Directory 1981, Ontario Ministry of Inter-governmental Affairs

Table 2. Percent of total street tree planting, six species combined (*Acer platanoides*, *Tilia cordata*, *Gleditsia triacanthos*, *Fraxinus sp.*, *Malus sp.* and *Sorbus sp.*); 10-year statistics (1971-1980) for 5 municipalities.

Year	%
1971	95.5
1972	88.8
1973	94.0
1974	93.8
1975	84.2
1976	93.1
1977	76.9
1978	88.3
1979	88.4
1980	93.2

Table 3. Percent of total street tree planting, six species combined (*Acer platanoides*, *Tilia cordata*, *Gleditsia triacanthos*, *Fraxinus sp.*, *Malus sp.* and *Sorbus sp.*); 5-year statistics (1976-1980) for 10 municipalities.

Year	%
1976	87.9
1977	75.2
1978	81.1
1979	77.0
1980	86.6

rate, low maintenance requirements and is adaptable to a wide range of sites. Use of the tree shows a steady decline during the early and mid 70's, reaching a low in 1977, then a sharp rise to nearly 50% of all trees planted in 1980. The research did not show any one particular cause for the decline in use, however in the authors' experience there were at least two contributing factors: 1) during the early and mid 70's there was some concern regarding *Verticillium* wilt (*Verticillium dahliae*) in Norway maple, which resulted in some reduced planting of the species; and 2) because Norway maple had been so prevalent in many new plantings, some municipalities attempted to utilize other species to a greater extent in an effort to increase variety. One possible explanation for the rapid increase in its use after 1977 is, that with declining municipal budgets, many urban forest managers feel they must go with a "sure thing" in Norway maple.

The use of linden (*Tilia cordata*) shows a steady decline throughout the 1970's. This can be attributed almost exclusively to establishment problems which many municipalities have experienced

(also personal communication with Dr. Peter Rice, Royal Botanical Gardens, Hamilton, Ontario). The tree seems to be much more restricted in terms of site requirements and needs more early attention than first thought.

As a group, ash (*Fraxinus sp.*), mountain ash (*Sorbus sp.*), crab apple (*Malus sp.*) and honeylocust (*Gleditsia triacanthos*) have increased in use, particularly as Norway maple and linden declined. Both ash and honeylocust were not popular selections prior to the 1970's. At least one large Ontario nursery destroyed fields of ash in the late 60's and early 70's (personal communication with Sheridan Nurseries, Oakville, Ontario). They have since gained in popularity and have generally stabilized in use. Like Norway maple, these species show a consistently good transplanting survival rate, require minimal follow-up maintenance and are adaptable to a wide variety of sites. Mountain ash and crab apple have, for the most part, maintained a steady proportion of use, with periodic up and down fluctuations. These species have been utilized to a great extent where there are height restrictions (e.g., beneath

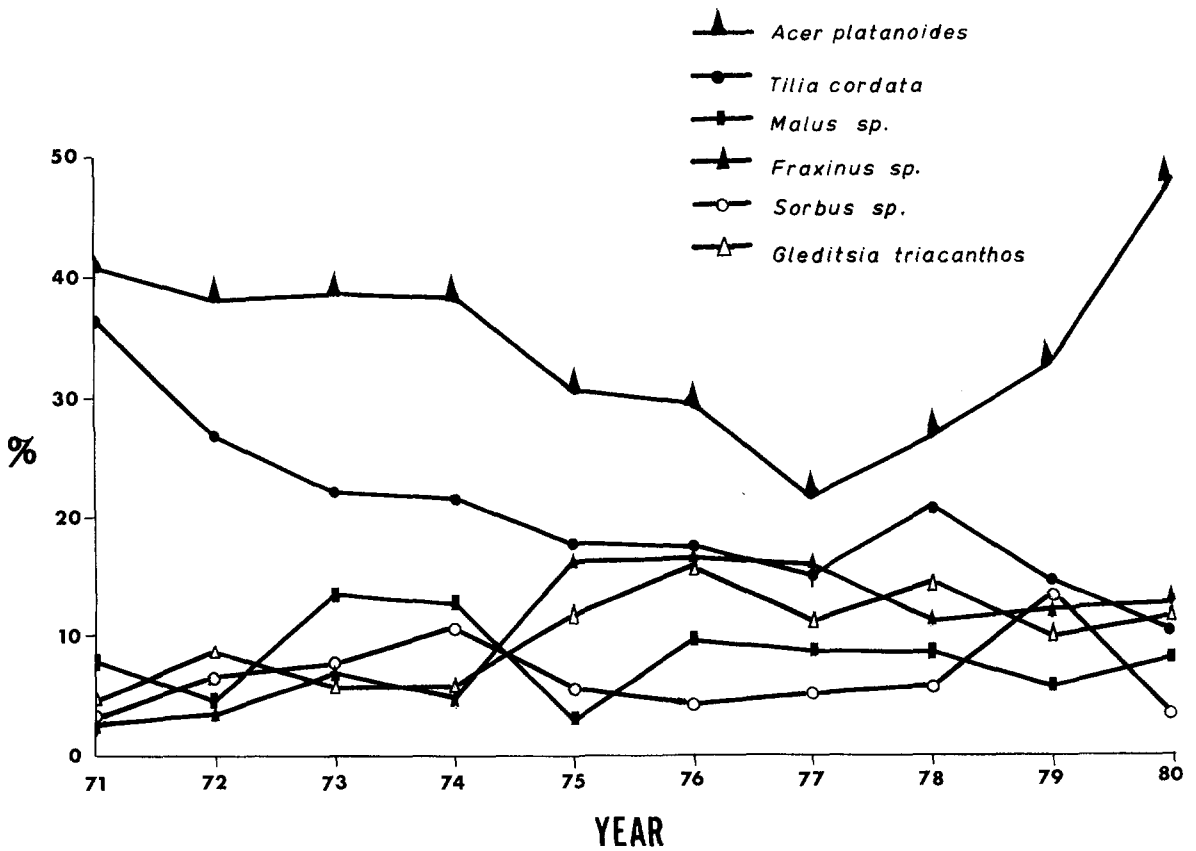


Figure 1. Percent of total street tree planting 1971-1980 six species: *Acer platanoides*, *Tilia cordata*, *Gleditsia triacanthos*, *Fraxinus sp.*, *Malus sp.* and *Sorbus sp.* (combined data from Barrie, Guelph, London, Mississauga and Waterloo).

utility lines).

The following can be said about the six dominant species with respect to southern Ontario conditions:

1. all six species tolerate a wide range of site conditions (*Tilia* appears to be more demanding than the others); in municipalities that border Lake Ontario, development is moving back from the shoreline with its relatively deep, well drained, sandy soils onto areas of heavier clay and clay loam soils which are often shallow to a shale bedrock; these conditions further favor the use of these species;
2. all six species readily transplant in both spring and fall; these species are therefore

used almost to exclusion in fall planting programs in municipalities.

Management Implications

The above factors suggest that, with the exception of linden, the same species will likely continue to dominate municipal street tree planting in the near future.

As the problems of height restrictions are eliminated through the installation of underground utilities in all new subdivisions, we may very well see some decline in the use of mountain ash and crab apple.

The older sections of typical southern Ontario municipalities are still dominated by mature native maples (red, silver, sugar) and oaks (red, white),

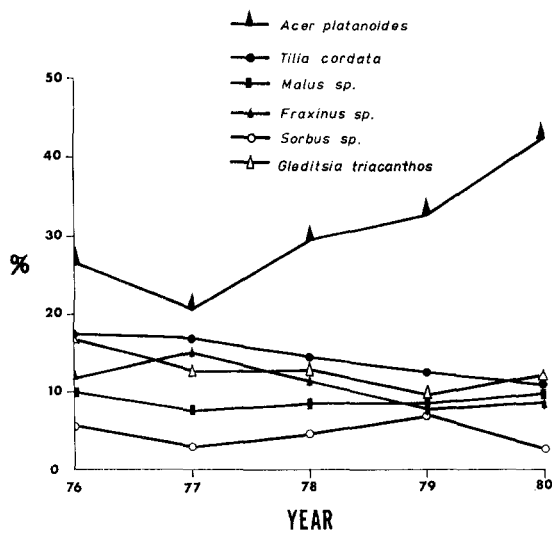


Figure 2. Percent of total street tree planting 1976-1980 six species: *Acer platanoides*, *Tilia cordata*, *Gleditsia triacanthos*, *Fraxinus sp.*, *Malus sp.*, and *Sorbus sp.* (combined data from Barrie, Cambridge, Guelph, London, Mississauga, North York, Richmond Hill, St. Catharines, Waterloo and Windsor).

with an admixture of a variety of other mostly native species. As these trees succumb, they are being replaced by the same species that are being planted in the newer developments. Thus, overall diversity is gradually declining.

The implications for a low species diversity are obvious, as our experience with Dutch elm disease has shown. Where large areas have been planted with one or two species, it may be a matter of sacrificing short-term aesthetics and ease in establishment and early management for long-term management difficulties if many trees decline or die at the same time.

Conclusions

Urban areas present numerous restrictions that limit the choice in planting material that can be successfully utilized. From the survey data col-

lected it is obvious that urban forest managers in southern Ontario feel there are six predominant species best suited to meet the problems of planting in their municipalities.

But while the choice of tree species will often be limited, every effort must be made to increase the diversity of the total planting program through better knowledge and utilization of the full range of plant material that is suited to a given site. We must ensure that on the good sites that are present we don't just plant the same old "standards," but exploit the full range of species options.

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