

A COMPUTERIZED STREET TREE INVENTORY SYSTEM FOR SMALL CITIES USING LOTUS 1-2-3

by Robert B. Warrick and C. Frank Williams

Abstract. A simple, user-friendly, computerized street tree inventory system using Lotus 1-2-3 as a data base is described. The sorting ability of Lotus allows for the generation of numerous kinds of lists. When Lotus-generated lists are used together with bound copies of block maps showing individual trees, this system of street tree inventories is very simple to use for parks personnel who may be computer illiterate and/or lack formal horticultural training.

During the summer and fall of 1988, the senior author of this paper conducted a street tree inventory for the City of St. George, Washington Co., Utah. St. George is a medium-sized Utah city with a population of 29,000. At present, the city has no official urban forestry program and what little work is done on problem trees is taken care of by the parks and recreation department or is contracted out. Parks and recreation employees in St. George generally lack formal horticultural training.

From the outset of the inventory, the problem of how to compile the data in a meaningful and useful way become apparent. Oftentimes, street inventories are conducted but the information is never used due to problems accessing, understanding, and updating the data (4).

It was decided to use Lotus 1-2-3 for two reasons. First, although Lotus is a spreadsheet program, it can also be used as a data base with text entered instead of numbers. Second, Lotus is probably the most widely used spreadsheet in the United States and runs on IBM compatible machines. Most cities already have the program and the computer hardware to run it, eliminating the expenditure of buying a program specifically designed for street tree inventories.

Materials and Methods

The field work for the inventory was conducted over a period of two months. A plat of the city was obtained showing all 230 numbered blocks within the inventory area. For each block, a single sheet

of 22 x 28 cm (8.5 x 11 in) paper was used to collect field data. Each tree was mapped and pertinent data collected, including the species, dbh (diameter at breast height), and percent live wood. Any specific problems that might require individual attention were also noted. Other information on each map included lot boundaries and, where available, house addresses. In the center of each sheet, the block number as well as the four streets bordering the block were indicated (Fig. 1). Tree locations were indicated with a 0.5 cm circle. Noteworthy trees found outside the city right-of-way were also mapped with a 0.5 cm circle but a star was drawn inside the circle to indicate this fact.

Following field data collection, the information was entered directly from the field data maps into Lotus files. The data for each tree were entered on one line divided into eight columns: common name, scientific name, dbh, percent live wood, block number (from the city plat), street, house address number, and existing or potential problems (Fig. 2).

Many inventories utilize a four or six letter code for each species of tree combining the first two letters of the genus, species, and cultivar names (2,3). For simplicity, both common and scientific names were listed. The percent live wood was entered only if the value was less than 100, zero being totally dead and 100 indicating no dead limbs. The block number was listed for reference to the city plat and to the final bound collection of block maps (Fig. 1). The street listing and house number (when available) provided an exact address for each tree. The last column was used to explain any problems an individual tree might have shown. To allow for margins and a binding width for hard copies, only 74 characters per line were printed across each page. Each problem

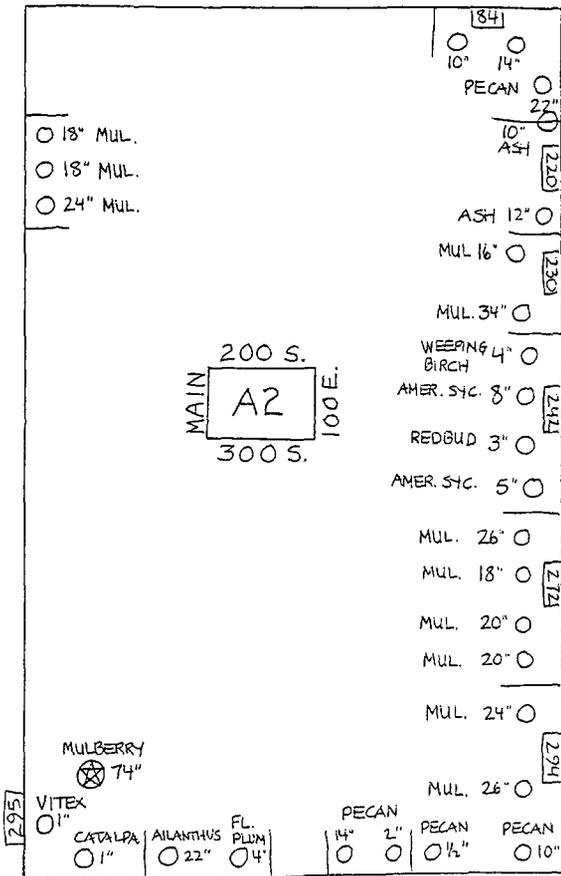


Figure 1. Example of a finished block map (reduced). The original field data were collected on the maps as the maps were drawn, then entered into Lotus files.

description in column eight was preceded with an asterisk such as, "*Bark exfoliating, SW corner." The "problems" column, when printed on paper, was only one character wide so that only the asterisk was printed (Fig. 2). Trees that were free of problems showed no asterisk. This alerts the computer operator to scroll to the right to see a complete description of the problem, or for those reading a hard copy, alerts the reader to turn to a separate section of the inventory where all trees with problems are listed and full descriptions are given.

Results

Approximately 3000 trees were enumerated as street trees with circa 500 others as park, municipal

golf course, and cemetery trees, as well as those trees located on the campus of Dixie College. A final copy of each block map was made showing block numbers, lot boundaries, addresses, and the common name, location and dbh for each tree. These maps, along with an alphabetized list of all trees, were photocopied and several sets were hard bound into books for use by the city as office copies, field copies, etc. Other sections of the book included a list of all trees with problems and an annotated list of all the different species of trees growing within the city. This annotated list includes descriptive information as well as general comments on the overall vigor and adaptability of each species to the area. Bound copies of the inventory combine interpretive information with "user friendliness" for those who lack horticultural training, which tends to be the majority of those employed by small city parks and recreation departments.

Many computerized inventories in the literature lack any sort of hard copies of maps to more easily locate individual trees. One problem which hampers most street tree inventories is locating the trees for future reference (1). Providing an easily-referenced, simple map of each block will simplify the process of taking a block number and a street from the computerized lists and being able to actually locate the exact tree on the block.

The Lotus program worked to our complete satisfaction. Less than ten minutes of instruction by the secretary of the city parks and recreation department were all that were required to enable the senior author to utilize the Lotus program. Lotus allows for 256 columns of information and the most recent update (1989) has room for 8,192 rows, or lines of text. Approximately 3500 trees were included in the inventory, leaving more than enough room to fit all trees into one Lotus file.

Lotus permits sorting of information by column, either alphabetically or numerically, in ascending or descending order, or by the presence or absence of such symbols as an asterisk. The data were entered into the computer in random order as it came off each field map. Then with the touch of a key, an alphabetized list of all 3500 trees was generated. The types of list that can be generated are almost limitless. Lists can be generated for a

COMMON NAME	SCIENTIFIC NAME	DIAM	%	BLOCK	STREET	HOUSE
Box elder	Acer negundo	34	99	B6	=600 E.	676
Box elder	Acer negundo	24	85	C18	Main	
Silver maple	Acer saccharinum	10	80	A18	=200 W.	
Silver maple	Acer saccharinum	8		A18	=200 W.	
Silver maple	Acer saccharinum	6		A18	=200 W.	
Silver maple	Acer saccharinum	6		A18	=200 W.	
Maple	Acer sp.	0.5		A40	=300 N.	*
Ailanthus	Ailanthus altissima	8		A1	=300 S.	
Ailanthus	Ailanthus altissima	20		A1	=200 S.	154
Ailanthus	Ailanthus altissima		80	A1	=300 S.	167 *
Ailanthus	Ailanthus altissima	1		A1	=200 E.	212
Ailanthus	Ailanthus altissima	22		A2	=300 S.	
Ailanthus	Ailanthus altissima	2		A25	Tabernacle	*
Ailanthus	Ailanthus altissima	0.5		A28	=200 N.	*
Ailanthus	Ailanthus altissima	1		A3	Main	284 *
Ailanthus	Ailanthus altissima	12		A35	=300 N.	
Ailanthus	Ailanthus altissima	46	99	A39	Diagonal	111 *
Ailanthus	Ailanthus altissima	14		A42	=500 W.	
Ailanthus	Ailanthus altissima	14		A42	=500 W.	396
Ailanthus	Ailanthus altissima	=1-4"		A45	=500 N.	*
Ailanthus	Ailanthus altissima	16		A50	=700 N.	
Ailanthus	Ailanthus altissima	20	95	A50	=700 N.	*
Ailanthus	Ailanthus altissima	14		A52	=700 N.	*
Ailanthus	Ailanthus altissima	2		A52	=700 N.	*
Ailanthus	Ailanthus altissima			A52	Diagonal	611
Ailanthus	Ailanthus altissima	2		A52	=700 N.	*
Ailanthus	Ailanthus altissima	8	98	A7	=300 W.	*
Ailanthus	Ailanthus altissima	3		AF1	=200 S.	*
Ailanthus	Ailanthus altissima	28	90	AF3	=100 W.	*
Ailanthus	Ailanthus altissima	22		AF4	=200 W.	

Figure 2. Example of a hard copy of a page from the Lotus files. This page has been alphabetized by the scientific name of the tree.

single block, a park, a section of the city, or for the city as a whole. The trees can also be sorted by dbh to determine, for example, how many trees have a dbh exceeding one meter, or by percent live wood to group trees posing a liability or which are in immediate need of maintenance.

The ease of use of the Lotus program will encourage its use by those parks department personnel who may be lacking in computer skills. Information entry is very rapid and uncomplicated,

being entered into each column as the cursor moves across the screen.

Summary

In conclusion, the street tree inventory carried out in St. George, Utah, has shown that Lotus 1-2-3 is a viable choice for organizing and storing inventory data. It is one of the simplest, most user-friendly programs available yet functional for a street tree inventory without the need for exten-

sive training. The sorting ability of Lotus allows for the generation of countless kinds of lists. A set of bound copies of block maps showing the exact location of each tree, when used hand in hand with Lotus-generated lists of trees, make this system of street tree inventories as simple as 1-2-3.

Literature Cited

1. Lindhult, M. 1987. *A microcomputer-based tree inventory system*. J. Arboric. 13(12): 304-309.
2. McPherson, E.G., J. McCarter, and F. Baker. 1985. *A microcomputer-based park tree inventory system*. J. Arboric. 11(6): 177-181.
3. Morsink, W.A.G. and L.O.W. Burrige. 1986. *Tree information: a split screen system*. J. Arboric. 12(4): 101-104.
4. Smiley, E.T. and F.A Baker. 1988. *Options in street tree inventories*. J. Arboric. 14(2): 36-42.

*Bonneville Floral Wholesale Greenhouses
Lehi, Utah 84043, and
Department of Agronomy and Horticulture
Brigham Young University
Provo, Utah 84602*

Résumé. Un système informatisé simple et conversationnel (emploi facile) employant le Lotus 1-2-3 comme base de données est décrit. La capacité de tri du Lotus permet la génération de nombreux types de listes. Lorsque les listes obtenues du Lotus sont employées avec les copies de cartes de localisation des propriétés, et bâtiments et sur lesquelles les arbres individuels sont aussi disposés, ce système d'inventaire des arbres de rues devient très simple d'utilisation pour le personnel des parcs et peut être informatisé par des gens sans formation spécifique relié au domaine de l'informatique et/ou de l'horticulture.

Zusammenfassung. Ein einfaches Benutzen-freundliches computerisiertes System unter Benutzung des Lotus 1-2-3 Programms als Datenbasis wird beschrieben. Die Sortiermöglichkeiten von Lotus gestatten die Entwicklung von zahlreichen Listentypen. Wenn von Lotus entwickelte Listen zusammen mit gebundenen Kopien von Strassenplanen, die individuelle Bäume zeigen, benutzt werden, so kann dieses System der Strassenbaumkartographie auch sehr einfach von Parkpersonal angewendet werden, dem es eventuell sowohl im COV Bereich als auch im Fachbereich Gartenbau an notwendigen Kenntnissen fehlt.