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 $SO_2$  during a single growing season. In addition, these results illustrate that certain changes in the pattern of growth may accompany seedling material exposed to high levels of  $SO_2$  for extended periods of time compared to similar plants grown in the absence of high  $SO_2$ . This information should be of interest to the nursery industry in terms of gaining a better understanding of the response of landscape plants to air pollution stress.

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# Let's Talk About an Inventory System<sup>1</sup>

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It's indeed a pleasure to be here in Montreal with you. I hope that you are enjoying yourself as much as I am. For the next few minutes our topic will be that of plant inventory and its control.

With the increasing competition and the rising cost of doing business it has become of vital importance to know the true cost of producing a plant. During the past five years I have been privileged to work with many nurseries and greenhouses. At each nursery, different marketing strategies, management philosophies and growing techniques were presented. And each nursery was successful; therefore, their techniques were good for them. Each one, however, had a common question left without an answer. That common problem without a solution was plant inventory.

If we look at plant inventory as an overall problem then it becomes too complex to analyze. For an efficient, accurate and flexible solution we therefore must address a modular system that allows different configurations for each grower, landscape, or retail garden center while at the same time providing the necessary information to all. For overall effectiveness the system must be simple to operate and be adaptable to many different computer systems be they large or small. From Apple to HP, to IBM, to TI, to Zenith. From a twothousand dollar to two-million dollar system. From a few varieties and sizes to thousands of varieties and sizes.

In the May 15 issue of AAN's *ALI* Magazine, we presented some of the common requests that we used for a design of this system. They are:

1. I would like to meet my competition in a certain  $\Im$  area for a particular variety and/or size.

2. I would like to give special prices to certain customers for certain plants.

3. I would like to put items on sale easily overall or for a specific area. I want to limit the quantity that I sell. I would also like the sale to last for a certain time period or until I run out of inventory. I would like the ability to extend this sale but have it removed without me having to do so, but I want to be told when it goes off.

4. I want to give my chain store customers overall quotes, area quotes, and individual quotes. I would like to limit quantities, set a certain time period that this will

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be good for, extend it if I want to. But when I no longer need it, have it automatically removed and have the computer tell me when it was removed.

5. I want to know how much a plant costs; and how these costs are broken down.

6. I want a history of my sales for twelve periods.

7. I want to be able to forecast what plants will be available for this and two more periods.

8. I want to know what my sales people are selling and how profitable they are.

9. I want to know if a customer or sales area is profitable.

10. I want to know what category of plant is most profitable.

11. I want several prices and freight rates that are easy to change and I also want to be able to exception them on an item basis.

12. I want to gather data without adding to the paper-work of my managers.

13. I want to know the cost of a bed, row, or location by the square foot.

14. I want to be able to work with any size that the industry may come up with.

Let's look at the individual building blocks of this modular system and see what each one does and what its purpose is. Computer files are just like file folders; they store information in them. The only difference is that on the computer the information is stored magnetically.

1. Accounts Receivable Master: This file stores information about our customers, their names, address, phone number, city, state, Zip Code, price code, tax rate, account status, balance due with aging, their geographic area, and several other fields that tell us if they have special prices quoted to them.

2. Customer History: The master file contains a rolling 12 month picture of: number of orders, units, plants, sales, and credit status. This provides us with a current 12 month picture at all times. It carries a yearly summary also. The detail file contains: products, size, units, quantity, sales, geographical area, and sales person. This information provides us with sales by categories, plants, areas, and sales people. It is extremely important, along with the master report, to determine if a sales person is productive; or a customer is profitable; or a sales area is profitable. It allows us to analyze any number of aspects regarding sales.

3. Supply Inventory: The supply inventory file gives us control of the material used in the growing operation. It is also the vehicle for dispersing these costs into our plant inventory. It contains item number, description, cost, vendor, quantity on hand, quantity used this month, and 12 months of usage history.

4. AQuote File: This file allows us to quote special prices to a chain store home office with quantity and data limitations. It can also be used for a "one-shot" quote such as a rotoadd. It contains variety, size, date, quantity, and valid until date.

5. BQuote File: This file provides us with the same types of features as the AQuote file except that it's used to quote special pricing to a particular area.

6. CQuote File: This file is similar to the preceding files and allows quotes to individual nurseries.

7. Area Sale File: This file provides a means of placing particular varieties and sizes on sale for a particular area. It has quantity and date controls. 8. Size File: The size file is our way of dealing with gallons, liters, height or spread, etc. It stores a description, cubic foot, freight factor, rack number for containers, or weight for B&B. One entry in the size file could be referenced by any plant that fits that size description.

9. Block File: This file allows us to describe a particular piece of property be it a bed, farm, row, greenhouse, etc. This file acts as a control to provide us with cost per square foot for that particular area. Information stored in it is square footage of that block, plant costs for that block, description of that block and the next order block. If we were describing a row then the next order block could probably be a bed or field.

10. Order Entry Header: The answer to our booking problems is in the next four files. The order entry header contains information about the customer, shipping dates, PO numbers, salesperson, comments, how to ship, etc.

11. Order Entry Detail: This is the other half of the order entry header. It has two types of records in it. One details information (things that we wish to say on the order), the other is the order line with variety, size, quantity, and price. These files are combined after invoicing to produce the customer history master and detail information.

12. The Order Analysis File: Records information on  $\frac{1}{2}$  the order. When input, it is reduced to categories, areas and sales. Totals are by day, month, and year, with units, quantity, and amounts for each distribution code.

13. Sales Analysis: This file is similar to the order analysis file except its information is accumulated at time of invoicing. With these two files you can see what you're selling and what you are delivering and billing by distribution codes.

14. Plant Master: This is the center of our system. It carries information on a variety of plants. It also has the common and botanical name along with hardiness level, category and sub-category. It acts as a summary file for that variety of plant. It carries some 24 totals of costing provided it by the plant detail file.

15. Plant Detail: This file carries information on all  $\Im_{\alpha}$  costs, pricing (5 levels) with a 6th level for overall sale  $\Omega_{\alpha}$ 



FILE INTERACTION CHART PLANT INVENTORY

price, discountable field, and 9 freight levels. The price and freight amounts are keyed from the accounts receivable master.

With the file interaction chart (see Fig. 1), we can see the modular relationship that this system has. It provides us with the ability to change as our business changes. It allows us to address a particular problem unique to a particular nursery, plant, size, area or customer. It assists us in determining how effective our salespeople are, how profitable our customers are, what customers are buying and when they are buying. It provides us with plant cost by size, by variety and by square foot.

These are our tools. With proper utilization by management this system can assist you in procuring a bright future. I've enjoyed presenting this topic to you and will attempt to answer any questions that you have.

## **Physical Amendment of Landscape Soils\***

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### Introduction

Land•scape (land'scap)—To improve the appearance of (an area of land, a highway, etc.), as by planting trees, shrubs, or grass, or altering the contours of the ground. [The Random House College Dictionary]

As this definition indicates, the 'ground' is the foundation for the landscape, and in most sites, the 'ground' is soil. The suitability of the soil making up the ground is, therefore, fundamental to landscape construction. It is judged by the soil's capability to sustain plant growth and by the landscaper's ability to construct and maintain desired topographic features with it. Soils are often physically unsuitable for these functions or are rendered so by construction or subsequent use. Unsuitable soils can often be improved by the addition of various chemical and physical materials.

Sand is probably the most commonly used physical amendment for landscape soil although various other organic and inorganic materials are also frequently used. Unless properly used, physical amendments may not benefit the soil and can actually worsen it. What constitutes proper use depends on the nature of the original soil; the nature of the amendment; and the purpose for which the soil and site are intended.

This paper briefly discusses the objectives of soil physical amendment and describes what happens to a soil's physical properties when it is amended with sand or other physical amendment.

#### What is Soil?

Before discussing physical amendment, we should first examine the soil's physical properties. What is soil? Ask ten different soil scientists and you are likely to hear ten different answers—all correct! Since landscaping is a practical activity, soil, for our purposes is probably best defined in relation to its uses in the landscape. From the plant's point of view, soil is any solid material in which it can grow and which will sustain its growth. *L* 61801 This functional definition covers a wide range of materials used in horticultural practice. Although most landscape soils are natural, some horticultural soils (potting mixes in particular) are not even recognizable as soil unless we actually see them used as soil.

Regardless of their composition, all soils consist of insolid, liquid, and gaseous components. The soil solidorder consists of particles and is called the soil matrix (see Fig. 1), and the liquid component consists of water and dissolved materials including mineral nutrients and is called the soil solution, and the gas component consists of the same gases as above-ground air and is called the soil atmosphere. Although the soil solution and atmosphere directly affect plant growth, whereas the matrix usually does not, the nature of these two components is largely controlled by the soil matrix. The soil matrix is therefore the most important physical part of the soil, overall, and is the part that we change, or try to change through physical amendment.

The matrix is the soil's foundation or framework and determines its overall physical character and suitability for plant growth and other landscape functions. It consists of minute, solid, inorganic and organic particles packed together into a semirigid, spongelike mass. The spaces between the particles form an interconnected tunnel-like network of soil pores permeating the soil mass. The pores are the single most important soil physical feature because roots grow in them, and water, fre air, and minerals are stored in and move through them. The nature of the pores also largely determines soil stability and resistance to compaction.

### What is Required of Landscape Soil?

In order to sustain the plant, the soil must provide water, minerals, aeration, support, anchorage, and an otherwise adequate root growth environment. In most soils, water and aeration are the most critical factors; too much water retention (resulting in poor soil aeration or poor drainage) or too little water retention are common problems in landscape soils. Water retention is determined by the nature of the soil pores. Small pores tend to retain water and impede drainage, while large pores tend to provide aeration and facilitate drainage.

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