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There I was in Columbus, Ohio – crossing my fingers like thousands of other association executives across the country – hoping that our annual conference and trade show would not be a victim of the immediate times. With attendance down as much as 35 percent at some trade shows that hadn’t cancelled, I had two prayers on my lips: one that our exhibitors would continue their commitment to create the world’s largest marketplace for the tree care industry; and two that our community would support them, too.

Well you did it!! We had a dynamite TCI EXPO 2001, with exhibitors expressing their happiness with the show and the business conducted. Attendance was within 13 percent of our goal.

Aside from the commerce aspect of TCI EXPO, there was a tangible feeling in the air. Go on. Admit it. You were just glad to be there and to be together. And so was I. It felt like one big family reunion. Wasn’t it just great to be able to celebrate life and the contributions that the tree care industry makes to the quality of our lives?

The Excellence in Arboriculture celebration – held for the first time at TCI EXPO – boasted hundreds of attendees, who had the opportunity to learn from their peers and congratulate them on jobs well done. We also moved the NAA’s Annual Business Meeting to TCI EXPO to provide an opportunity for more members to participate in electing officers, conducting business (such as approving the Code of Ethics), and to give an interim State of the Association address. There were more students at Career Days than in the history of our program. We went down with 250 student registrations and that number continued to climb onsite, offering proof that the vitality of the tree care industry is safe for the future.

Wherever we gathered throughout the convention center there was a sense of hope. Nobody was focusing on the past – everybody in committee meetings was looking to the next great opportunity to create resources for education, business management, tree care standards, and the strategic plan of NAA.

Author Sandy Sheehy asks, “What is it about friendship that makes being among friends so much richer than being among the most accomplished and interesting strangers?” And that’s how it felt at TCI EXPO. There wasn’t a stranger in the group. The common bond that you all share in this community was evident on every face, in every encounter, in every “United We Stand” bumper sticker you bought, and in every plan for your future.

Thank you for your courage, your hope, and your friendship. The tree care industry has never stood prouder.

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Publisher
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December
continued on page 6

Features

8 Forecasting Dreams
By Howard L. Eckel

26 Grinders: The "Big Dogs"
By Rick Howland

58 Detection of Decay in Trees & Wood
By J. A. Dolwin

Departments

2 Outlook
By Cynthia Mills, CAE
Industry leaders don't let anyone or anything stand in their way.

16 Washington in Review
By Peter Gerstenberger
EPA unveils a spray drift proposal that would cause serious harm to the industry. Make your views known.

18 Branch Office
By Mary McVicker
Without a clear understanding of costs, profit will be more by accident than by design.

20 Industry Almanac
Important regional and national meetings and activities

22 Cutting Edge
New products and news in the tree care industry

32 Urban Forestry
By Don Dale
California tree society brings new work to arborists who prune trees correctly.

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During a discussion on forecasts with an international merchant banker, I noticed he used the word "prognosis" rather than forecast. Apparently, more people worldwide understand the meaning of prognosis. In either case, the words have a common meaning of "predict." Personally, I favor the word "dreams" to describe forecasting. We all are optimists when it comes to thinking about next year and what we intend to accomplish. Many ideas run around in our head on how we can do "it" better. "It" could be increasing profits, achieving additional production efficiency, having a better equipment maintenance program, and even having more personal time. Forecasting is the documentation and quantification of these ideas and dreams. Forecasting is the process of translating dreams into dollars and cents.

Figure 1

EXPLANATION OF CHART OF ACCOUNTS

Rule: Total Assets equal Total Liabilities plus Owner's Equity

ASSETS
1010 CASH/CHECKING
Cash in checking account. (Cash needed to meet short-term requirements—30 days or less)

1012 CASH RESERVES, SAVINGS OR OTHER INVESTMENTS
Cash in savings, money market accounts, etc. (Cash not needed in the short term should be deposited in an income-earning account.)

1014 PETTY CASH
Cash kept on hand to reimburse out-of-pocket expenses such as tolls, phone calls, etc.

1020 ACCOUNTS RECEIVABLE
Total of invoices sent to clients for work completed but not yet paid.

1030 DEPOSITS/PREPAID EXPENSES
Amounts paid in advance for goods or services. (Deposits on rent, supplies ordered but not yet delivered, etc.)

1032 PRE-PAID INSURANCE
Premiums paid in advance of the period of coverage such as Worker's Compensation Insurance or other deposit premiums. (Check with your accountant for further information.)

1040 EQUIPMENT & MOTOR VEHICLES
Includes items considered to be capital purchases such as trucks, chippers, etc.—but not ropes, saddles or small tools. (Check with your accountant for further information.)

2010 ACCUMULATED DEPRECIATION (equipment & motor vehicles)
Total of monthly charges (Act. #0025) for depreciation of equipment & motor vehicles from profit and loss statement. (This is shown as a minus figure.)

2030 LAND (Land does not depreciate)

2035 BUILDINGS
Purchase price of real estate owned, excluding land.

2040 ACCUMULATED DEPRECIATION - BUILDINGS
Total of monthly charges for depreciation of buildings (Act. #7035) from profit and loss statement. (This is shown as a minus figure.)

2050 FURNITURE & FIXTURES
Purchase price of furniture or fixtures. This is generally items costing over $500 and having a useful life of over one year. (Check with your accountant for further information.)

2055 ACCUMULATED DEPRECIATION - FURNITURE & FIXTURES
Total of monthly charges for depreciation of furniture & fixtures (Act. #7046). (This is shown as a minus figure.)

LIABILITIES
2010 NOTES PAYABLE - CURRENT PORTION
Principal on note payments due within 12 months for bank loans, mortgages, etc. (Does not include interest payments.)

EXHIBIT C

EXPERT ARBORCARE CO., INCOME AND EXPENSES

INCOME

YEAR
5010 TREE CARE & REMOVAL
5020 FERTILIZING
5030 PEST MANAGEMENT
5040 LANDSCAPING
5050 OTHER
5060 TOTAL

EXPENSES

Direct Expenses

6010 PRODUCTION PAYROLL
6015 PAYROLL TAXES
6020 WORKERS COMP INSURANCE
6025 DEPRECIATION EQUIP. & M.
6030 EQUIP. MAINTENANCE
6035 EQUIP. & VEHICLE INS.
6040 GAS & OIL
6045 GEN. LIABILITY INSURANCE
6050 HEALTH/LIFE INSURANCE
6060 MATERIALS & SUPPLIES
6065 OTHER OPERATING COSTS
6070 TOTAL DIRECT EXPENSES

Sales & Administrative Expenses

7010 ADMIN/SALES PAYROLL
7015 PAYROLL TAXES/INSURANCE
7020 TELEPHONE
7025 ADVERTISING
7030 DUES & SUBSCRIPTIONS
7035 DEPRECIATION BUILDINGS
7040 BUILDING & GROUNDCARE
7045 MEETING & TRAINING
7050 OFFICE SUBS.
7055 DEPRECIATION EQUIPMENT
7060 PROFESSIONAL FEES
7065 INTEREST
7070 TOTAL ADMIN/SALES EXPENSES
7075 TOTAL EXPENSES
7080 TOTAL INCOME
7085 TOTAL

TREES FOR HEALTH
Is forecasting worth the time and effort? Absolutely! Without a forecast, a company is usually doomed to a fate that others will for it. Chance, a roll of the dice, the whims of life, the blowing wind, all will have more control over what happens to a company than the company owner has. The process involved in forecasting makes you think ahead, anticipate and plan.

Bankers were the ones who forced me to undertake the forecasting process. They wanted to know how I was going to make my dream a reality and how much it would cost. When would the costs affect me? What was the payoff?

I was forced out of my eternal optimism. “Wait until next year – things will really be great,” did not fly with bankers. They wanted to know just what miracle would happen to make next year an improvement. In the end I discovered they were correct. It may sound corny and trite, but if you don’t plan for your future and that of your firm, you’re not going to have one. While thinking ahead and detailing what you want to accomplish isn’t the same as guaranteeing those results, it is better than hoping and wishing next year will be better.

The accuracy of the forecast will depend on how honest you are. I’ve always maintained that if people lie to themselves, they will lie to anyone. Saying that next year will be better, more profitable, or smoother is probably the most prevalent lie. Call it eternal optimism, hope springs eternal, or any number of catch-all phrases. Businesses succeed in direct proportion to the effort extended in controlling their destinies. Anticipating, planning – working smarter.

Where and how to start?

I would suggest you start by using the Profit & Loss Statement format in the “Chart of Accounts and Simplified Accounting System for Tree Care Companies” chapter of the National Arborist Association’s Management Guides (Figure 1) as an outline to guide you through the forecasting process. If your own Profit & Loss Statement is not close to the NAA’s layout, rearrange your cost items in the same order as the NAA’s layout! In this article, I will also use some of the dollar figures illustrated in the NAA’s “Developing a Sales Price Per Hour” section of the Management Guides. I suggest you use the section’s worksheets to review your hourly billing rate once you have completed the forecasting process.

The NAA’s layout basically details four sections of a Profit & Loss Statement:
- Income (Sales)
- Direct (Variable) Costs, which are concerned with production expenses
- Sales & Administration (Fixed) Costs
- Pre-tax Operating Profit.

You should begin the forecasting thought process before the end of 2001. Start with the year-to-date numbers you have. Then, project by month the rest of 2001. First, forecast sales; then forecast direct costs. Estimate next the fixed costs of sales and administrative expenses. Finally, focus on what the operating profit will be.

You know what your order backlog is and what your current costs are by category. Project these out to the end of your fiscal year. Obviously the closer to year-end your statements are, the easier it will be to forecast the balance of the current year. By early December you should have all of your numbers in through the end of October. Once you have established your best guess of what the year-end will look like, you can tackle next year. One helpful hint: Make an additional column and list all costs as a percentage of sales for each item. Percentages can act as checks and balances as you tackle next year.

Start the forecasting process by asking yourself what your sales for next year will be. I recommend you don’t spend a great deal of time on the sales figures early in the forecasting process. Ballpark a figure, perhaps factoring a little for inflation and enough to cover merit wage increases. If you are planning an additional crew, you need to forecast the sales vol-
ume increase they will generate, beginning with the month they start working. Spend more time at the beginning working on cost items. Why? Your sales figure is influenced by costs, pricing, volume and inflation. It is better to determine your other costs first. These costs will influence whether you will need a sales rate increase or perhaps more sales volume.

The direct (variable) expense section (production or field costs)

Production Payroll: Determine the level and timing of wage increases to be handed out next year to each production individual. Determine the total increase as a percentage of this year’s wage base that you have just projected to year-end. If the increase commences next March, apply that percentage to the production payroll starting in the month of March and beyond.

If you want to see the immediate impact a wage increase has on sales or profit, then having the current year’s costs expressed as a percentage of sales will help. Production wages will usually be somewhere between 22 percent to 33 percent of total sales, depending where your accountant books vacation and holiday costs.

For example: Your best late-in-the-year forecast indicates that current year’s sales are going to be $610,000 with production wage costs at 27.6 percent of sales, or $168,360. If you increase the total wage base by 6 percent, including merit increases, multiply the current year wage base dollars ($168,360) by 6 percent, which gives you a next year’s wage base of $178,460. That means an across-the-board wage increase of 6 percent will add $10,100 (plus the increased payroll taxes that would be applicable). When you are finished with your forecasting, I recommend again that you run the cost figures through the forms contained in the NAA’s Management Guide “Developing a Sales Price Per Hour.” You will then know whether you have to alter your hourly selling rate.

Based on what happened this year, if you have been toying with the idea of adding another crew to handle the spring rush, add in the additional labor cost commencing with the month they are added. Sitting at your desk in the late fall you can start thinking about who will be the crew leader and, more importantly, where the rest of the crew will be coming from. Who will be with them? What vehicle will be available? Need a new one? Do you have to do some training this winter to have a new crew up to par by spring? Is this going to be a cost? Thinking ahead raises a lot

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<table>
<thead>
<tr>
<th>SIZE/LENGTH</th>
<th>AVG. STRENGTH</th>
<th>REC. THROWING WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.75mm x 180-ft.</td>
<td>400 lbs.</td>
<td>8 to 10 oz.</td>
</tr>
<tr>
<td>2.2mm x 180-ft.</td>
<td>575 lbs.</td>
<td>8 to 10 oz.</td>
</tr>
</tbody>
</table>

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of questions, which, if addressed honestly, turn into advanced planning.

Once you have developed and forecast the total production wage base by month for 12 months, you can use a percentage to calculate payroll taxes and workers’ compensation insurance costs. It is now time to ask some questions of your insurance carrier: What is the State Manual Rate going to be? What is your accident experience for the last three years? What will your workers’ compensation rate per hundred dollars be?

If premium costs are increasing because of accidents, shouldn’t you budget for an accident-control and retraining program? It is going to add to your costs. However, the trend of increasing accidents must be reversed. The training program costs probably should be booked as a separate item. I prefer a separate category in the “sales and administration” section. This keeps direct production costs pure field costs.

Once production wages and their attendant costs have been forecast, equipment costs should be reviewed. New vehicles for growth will add depreciation, fuel and maintenance costs. Depreciation costs are determined by dividing the purchase and alteration cost by the anticipated useful life in years, then months. A simple yet accurate way to forecast fuel, licensing and maintenance cost is to double the depreciation dollars to cover these items.

A forecast will not come up with answers. It will expose possible future situations. The forecast of a part-time or additional crew and everything that has to go with it may not work out on paper. Profits are negatively affected beyond acceptability. Perhaps you can delay adding another crew by switching existing client sales to less busy seasons.

Expanding and making purchases on paper first is a prudent business practice. If you are replacing a worn-out unit with a new vehicle, the depreciation costs need to be determined. But don’t forget to reduce the repair costs by the amount that old klunker set you back this year. A new or reliable, newer unit won’t be broken down along the highway with the crew idle, so there should be some efficiencies that can be planned on.

As you look down the list of the NAA’s sample Profit and Loss Statement format, each item listed should elicit some thought, reaction or prompt you to ask questions. Is health insurance going up? When and by how much? Find out now, not after the fact.

When you review the fixed costs in the sales and administrative section, you can determine the effect of wage or salary increases for the office staff. Consider other items too. Better yet, set a budget and live by it. 

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Tree Care Industry - December 2001
what are they going to cost? You might find it easier if you break advertising down into subsections of newspaper, direct mail, donations and Yellow Pages. If most of your volume is coming from referrals, you might consider reducing the Yellow Pages advertisement size. Do away with the display ad and settle for a bold listing, so people looking specifically for your number can find it easily.

Does the building need some work or is the rent going to go up? Are you planning to implement new software? What is the installation cost estimate? (Better double that to be safe!)

Go over each item and budget the costs in advance, especially the months they commence. Too often people learn that a cost item, such as health insurance, is going up. But if rates won’t rise until April 1, be sure you only budget costs for nine months rather than the entire year. Think ahead on each line item of your P&L statement. Then let your mind rest by putting it aside for a few days. I’ll bet the farm you will come up with some revisions and adjustments. All to the good!

When you are finally finished, what have you developed?

First, if you follow the steps in the NAA’s Management Guide “Developing a Sales Price Per Hour,” you can develop your hourly selling rate and/or confirm the accuracy of your existing rate.

By thinking ahead and forecasting, you can begin to estimate bank borrowing and a payback schedule. (What the banker wanted all along!) You have developed budgets for some cost categories, which augurs well for fiscal discipline. (Another thing the banker wanted.) The most important event that came from forecasting is the by-month and then year-to-date projections. You now have a reference. You are not drifting. Each month you can check reality with what you forecast. I started analyzing and comparing what I projected to what was actually happening instead of just looking at the P&L statement every month as a report card.

A good manager will instinctively do two things: go where the bad news is, and then ask the right penetrating questions. What is off and why? Was it a wrong guess in forecasting or is there a dangerous trend developing? Instead of simply saying it would get better next month, I took corrective steps to make sure it was better. I was no longer the optimist. I turned from a dreamer into a pragmatist, but by doing so I did achieve most of my dreams.

Howard L. Eckel is a management consultant and coach. He draws on almost 40 years of tree industry experience and was executive vice president and general manager for the Davey Tree Expert Parent and Canadian Company prior to retirement. This article is from his forthcoming book “Know The Answer – Work The Problem” to be published in 2002.

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Proposed Drift Regulation Unworkable

On Aug. 22, 2001, the EPA published a draft Pesticide Registration Notice (PR Notice) relating to “Spray and Dust Drift Label Statements for Pesticide Products.” The draft notice applies to both agricultural and specialty products, including products used on home lawns and gardens, recreational areas, rights-of-ways, and forests.

The full text of the Notice can be viewed online by typing the following in your Internet browser’s address field: http://www.epa.gov/fedrgstr/PEST/2001/August/Day-22/p20798.htm.

The Notice impacts all products applied as sprays or dusts, including applications with ground hydraulic, airblast, aerial, chemigation, handheld, or backpack equipment. The notice does not impact outdoor granular products or other outdoor products that are not applied as a spray or dust, fumigants, or mosquito adulticide products labeled solely for use in public health programs.

The notice requires “no detectable residue” outside the treated area and mandates strict limitations on wind-speed, equipment settings and other application parameters. In the past, “no detectable effect” was the standard.

The bottom-line for applicators? While proper use and good stewardship dictate that spray applications be done carefully, and that off target areas not be impacted, the requirement for “no detectable residue” would be functionally impossible to achieve. In other words, any outdoor application covered by the Notice would by definition be a label violation.

Obviously, this will have a great impact on the segment of tree care industry that applies pesticides. The NAA Governmental Affairs Committee developed a list of issues on this matter, in order for the NAA to develop a position statement. The Committee’s goal is for every member company that applies pesticides to submit comments to NAA, which will be used to develop the position statement.

Issues

**Issue One:** In the Background Statement section of the notice, the EPA recognizes that it, “has been working to improve the underlying science of pesticide spray drift, its understanding of the science, and the most effective means to control or mitigate spray drift.” This proposed change in law appears to abandon this previous effort to understand and mitigate the natural phenomenon of spray drift, and instead simply mandates that all spray drift shall be illegal, which serves only to shift total liability to the applicator. The industry’s position should be that the law should allow for mitigating factors, and focus on the efforts made by the applicator to mitigate spray drift.

**Issue Two:** In the EPA Position on Pesticide Drift section, the EPA admits that it, “has the responsibility to ensure that the use of pesticides will not cause unreasonable adverse effects to human health and the environment.” Up until this point, the focus has always been on “unreasonable” adverse effects.

**Issue Three:** In the EPA Position on Pesticide Drift section, the EPA states that it, “believes that the suggested labeling in this notice will reduce risks associated with pesticide drift ...” This assertion is not true. Making drift a label violation does not address the real issue of helping applicators mitigate and control drift. This proposal only serves to shift the blame to the applicator without presenting any guidance on the real issue of drift mitigation measures.

**Issue Four:** In the EPA Position on Pesticide Drift section, the EPA states that current law allows states to regulate drift with language such as, “do not allow drift” or, “[a] person may not apply if wind speed exceeds 10 miles per hour.” Then the EPA makes the self-serving claim that the proposed changes are the same or less restrictive than the aforementioned types of statements given under various state laws. This is clearly not true. The industry’s position should be that the issue of regulating drift should remain with the states. State guidance has been specific, effective, and has given the applicator guidance on what is or is not allowable. The issue of damages caused by pesticide drift has always remained the responsibility of the applicator.

**Issue Five:** In the EPA Position on Pesticide Drift section, the EPA states that it, “believes that the suggested labeling in this notice will reduce risks associated with pesticide drift ...” This assertion is not true. Making drift a label violation does not address the real issue of helping applicators mitigate and control drift. This proposal only serves to shift the blame to the applicator without presenting any guidance on the real issue of drift mitigation measures. The industry’s position should be that the state mandates are not inconsistent or unclear, and that this proposed change will have little or no effect on reducing drift, therefore this effort should be abandoned and the EPA should re-focus its
efforts on drift mitigation and control procedures.

Issue Six: In the Label Statements section, the EPA states that it, "acknowledges that this guidance may not be appropriate for all products and their uses and that for certain products there may be exceptions to the wording of these statements." However, in the very next section, the EPA makes no allowance for different products or uses. The industry's position should be that the products used in the arboriculture industry should be exempted from these labeling requirements because of their usage and their low risk characteristics.

Issue Seven: In the Label Statement Guidance section, the EPA proposes label language that is directed toward agricultural sites and application, but further proposes that this language should apply to all types of pesticide applications. The industry's position should be that pesticide applications made to lawns, trees, and shrubs, should have specific language, which accounts for the higher degree of likelihood that drift may occur, and that the EPA should not attempt to regulate the arborist industry with language geared toward another industry.

Issue Eight: In the Possible Additional Product-Specific Labeling section of this notice, EPA raises the possibility of "no spray zones" being included on certain labels in the future. This is an attempt to regulate through the back door by avoiding comment specific to this issue. By placing this section in this notice at this time, the EPA is attempting to present this issue to the affected parties for the purpose of meeting the legal obligation to provide notice and obtain comment. But, without more specific information on exactly which pesticides will have "no spray zones" on the label, and what the proposed no spray zones will be for each product, pesticide users cannot make meaningful comment on this issue. The industry's position should be that this provision is stricken entirely, and that the EPA presents this issue on a case-by-case basis only after providing specific information as to its intent.

The tree care industry's concerns are consistent with the concerns of other Green Industry organizations.

EPA hopes to have new spray drift label statements substantially approved by Oct. 1, 2003. The agency said it plans to start evaluating the new label statements immediately in applications for registrations, amendments, and re-registration of existing products. Once the new statements are approved, registrants would generally have 18 months from the date of the new label to distribute or sell products with the old spray drift labels.

The comment period for this PR notice was to have closed Nov. 20, but has been extended until Jan. 19, 2002.

If your company is an NAA member and you would like to add your voice to NAA's position statement, please forward your comments to the NAA Governmental Affairs Department by Dec. 15. You may e-mail the author at peter@natlarb.com.

Peter Gerstenberger is vice president of business management, safety & education for the National Arborist Association.

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**TREE CARE INDUSTRY • DECEMBER 2001**
"We passed the break-even point about 18 months ago — now all I worry about is the profits."

We pay a lot of attention to breaking even when a business gets started. We make careful estimates. We look to turn the corner in a year or so. We may lose sleep over the break-even point. When the day finally comes and that magical point is passed, everyone breathes a little easier — and the break-even point is forgotten.

Information about break-even points can be useful well after startup, however. Throughout the life of the business, questions will arise about costs, prices and profitability. One significant aspect of running a business is evaluating changes and alternatives. Break-even analysis looks at alternatives and changes.

What is break-even analysis?

Break-even analysis can address such questions as:

1. What will be the result if I reduce my office costs by 1 percent? Is it really worth the trouble?
2. How much would I have to increase sales to increase my profit by $20,000?
3. Which product line (or service) is the most profitable?

The answers aren't always obvious. It's not unusual for a manager to find that the product she always thought was the most profitable is barely breaking even, or is even losing money.

Costs

Break-even analysis begins with costs: If the business is meeting all of its costs, it's breaking even. Costs come in different varieties and can be classified in various ways. The classifications we're interested in here are "fixed" and "variable."

Fixed costs are stable, or nearly stable. Rent and insurance premiums are examples of fixed costs. From year to year they may change, but in the short term they are generally constant and aren't affected by the level of business activity. Your sales could double from February to September, but your rent won't change.

Variable costs are affected by the level of business activity. When production increases, variable costs are higher. You will pay more employees more wages, use more fertilizer, and replace more saw chains and chipper knives.

Some costs are both fixed and variable. Utility costs, for example, usually carry a fixed rate, so that even if there's no production, the business would pay the cost. In addition, the business pays for usage of the utility over that rate, and that usage tends to fluctuate according to increases in production. Utilities, then, have a foot in both camps. Such costs are referred to as "semi-variable" costs. For our purposes, it's enough to know a cost can have both variable and fixed components.

Calculating break-even points can get complicated, but you can get useful insights without going the whole route of calculation.

The first step is to allocate all of the costs of the business between fixed and variable costs. This is the hardest part of the analysis, and you may want to have an accountant help you.

If spending money for information on costs strikes you as a poor spending choice, keep in mind that a precise summary of costs has a variety of other uses. Accurate pricing, for instance, depends on accurate knowledge of overhead, which is derived from a summary of costs. One contributing factor to small business failures is that managers don't price services to cover their costs. Costs are not always what they seem.

Timing

The time of the year that you reach the break-even point says a lot about the pattern of your cash flow and business activity. Suppose your business has annual sales of $310,000 with average monthly sales of $25,833. If your break-even point is $260,000, then your business doesn't reach its break-even point until around the 10th month of the year! And the final months are not all profit, by any means. Months 10, 11 and 12 all have costs associated with them.

Of course this assumes that the business isn't seasonal at all, and sales are even. That isn't true for most tree care businesses, and seasonality can skew the timing of the break-even point. Since the business doesn't reach break-even until late in the year, a slowdown or downturn of sales earlier in the year could rapidly narrow that margin. What alternatives does the business have to widen that margin?
Reduce variable costs

What happens if the business reduces its variable costs by 2 percent? The reduction may not seem like much in absolute terms — for most businesses several thousand dollars — but it's enough to give the business a more comfortable margin.

Reduce fixed costs

What happens if the business reduces its fixed costs by 2 percent (keeping the other figures at their original amounts)? That, too, would reduce the breakeven point by several thousand dollars. Again, the difference may seem minor but will have a positive effect on the profitability margin.

If the two reductions were combined, the difference in breakeven point would seem very significant. Making these projections works only if the cuts can be made without affecting sales. Otherwise, the lower sales figures should be incorporated into the computations.

It's important to keep in mind that most businesses aren't able to make drastic cuts in costs without affecting the business operations. A larger cut in either type of cost would give a more dramatic difference, but a 2 percent cut is probably more realistic for most businesses.

Increasing profit

How much would sales have to increase to increase profit by $10,000? Obviously, the increase isn't direct; the additional costs have to be taken into account. Suppose the analysis determines that a $10,000 increase in profit would require additional sales of about $27,000. Is the increase worth it? Possibly not.

Levels of profitability

Profitability doesn't increase at a steady rate — variable costs get in the way. Businesses have different levels of profitability, depending on the structure of their costs. Sometimes a company is better off and more profitable operating at a lower level. A business with sales of $50,000 isn't going to be twice as profitable as it would be with sales of $25,000. Many industries have certain (several) optimal sizes, and businesses tend to cluster around certain sizes. We all know that, but it's easy to lose sight of that when people start talking about growth and expansion.

Conclusion

Breakeven analysis by itself is not going to increase a business' profit or generate more cash flow. It can, however, yield useful insight about how that profit is derived, and about the effect of certain expenditures. Without a clear understanding of costs and their relationship to profitability (and other costs), profit in the business is going to be more by accident than by design.

Mary McVicker was a tax attorney before leaving to teach and write. She has been a small-business consultant and freelance writer in Brookfield, Ill., for more than 17 years.


Events & Seminars

Don't miss these upcoming events

December 11-12, 2001
Illinois Arborist Association
19th Annual Conference and Trade Show
Pheasant Run Resort
St. Charles, IL
Contact: April Toney (877) 617-8887,
e-mail: ctoney1@earthlink.net

December 13, 2001
Ohio Chapter ISA, Tree Appraisal Workshop
An Introduction to the 9th Edition of the
CTLA/ISA, “Guide for Plant Appraisal”
Winton Center, Hamilton County Park District
10245 Winton Road
Cincinnati, Ohio 45251
Contact: Ohio Chapter ISA, (216) 381-1740,
Answers to Last Month's Puzzle:

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SAG
SPUR
SALT
CMA
TIME
ANSI
AOL
ATAD
NODS
BRANCH
WAD
OXS
OXYGEN
HANDS
DOE
AVE
OGEE
BID
APEX
RAH
PEG
AGENT
TRIPLE
NBA
ROT
ISSUES
MENUL
ENO
SEE
LEON
EVER
DLT
OGRE
SER
BASH
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December 2001/E. Leif Graefen
Wooley New Marketing Manager at Dow Ag

Chris Wooley has been named marketing manager for turf and ornamental insecticides at Dow AgroSciences LLC. He will be responsible for overseeing all aspects of marketing products.

Wooley joined Dow AgroSciences in 1998 and most recently was the communications manager for the Midwest crops business. He is a 1993 graduate of the University of Wisconsin-Madison where he earned bachelor’s degrees in agronomy and soil science. He also holds a master of science degree from Iowa State University.

Mehrabian Named Assistant Marketing Manager at RedMax

Komatsu Zenoah America, Inc., has named Afshin Mehrabian assistant marketing manager for its RedMax handheld power equipment.

He will be based in the company’s Norcross, Ga., headquarters. Mehrabian will assist with the expansion of RedMax’s domestic and international markets, as well as support existing and new distributors and dealers.

Before joining RedMax, Mehrabian held sales, market research and management positions with several national companies, including Emery Worldwide and Proctor & Gamble.

He earned a master’s in business administration, summa cum laude, from American InterContinental University in Los Angeles; a bachelor’s degree in business administration, magna cum laude, from American InterContinental University in Atlanta; and an associate degree, magna cum laude, in administration of transports and logistics enterprise from the University of Brussels in Belgium.

C. Smith Retires After 29 Years with Samson

Chuck Smith, longtime vice president of marketing at Samson Rope Technologies, retired at the end of October 2001 to pursue other interests. For 29 years, Smith was the driving force behind Samson’s sales and marketing efforts. His creativity fostered many unique and successful partnerships and product launches.

Smith will remain with Samson as a consultant throughout 2002.

With the announcement of Smith’s retirement, David Johnston was appointed director of marketing. Johnston joined the Samson marketing team in August as product manager. His background includes senior management experience with corporations including Armstrong World Industries, Merillat Industries, Poulan Weed-Eater, Fisher Price and Hallmark Cards. Johnston holds an MBA in marketing from Duke University.

ACRT Establishes Chicago Training Center

ACRT, an arboricultural vocational training organization, has established a new Midwestern training center on the campus of Wilbur Wright College in Chicago. The new center will train all levels of tree care employees, from entry level to experienced. Classes will be available seven days a week, in English and Spanish.

For a list of courses, contact ACRT at 1-800-847-3541, Ext. 240, or visit www.acrtinc.com.

Packard New President of Wright Tree Service

John R. Wright, who has been president of Wright Tree Service, Inc., since 1982, appointed Scott Packard as president and chief operating officer at a recent board meeting. Other appointments announced were: Bob Myers, senior vice president, operations; Will Nutter, vice president, division operations; Terry McGonegle, treasurer and chief financial officer; and Allen Taylor, vice president. Wright will retain the title of chairman and chief executive officer.

Packard came to Wright Tree Service three years ago from Herman M. Brown Construction Co. in Des Moines, Iowa, where he had been executive vice president. At Wright
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Tree Service, he was vice president of administration before being named president.

Wright Tree Services serves an 18-state area in the central United States. The company works primarily with utilities and municipalities in line clearance, vegetation management and grounds maintenance.

The company was founded in 1932.

Trade A Plant Web Site Online

Trade A Plant Web site is now online. Trade A Plant's online service at www.tradeaplant.com allows the community to buy, sell and trade backyard plants. Buyers can also select from plants listed in Trade A Plant's Retail and Wholesale Shopping Mall. Trade A Plant provides homeowners with an alternative to just cutting down unwanted backyard trees and plants, giving them the opportunity to sell the plants online. It costs the owner $25 to advertise their plant's availability and potentially make a few dollars selling it, or just give it away and save on removal fees.

Elli Names Zino Division President and COO

Environmental Industries Inc. recently announced that Roger J. Zino, former principal with the Los Angeles office of McKinsey & Co., has been appointed president and chief operating officer of Elli's landscape management division, Environmental Care. Zino has also been appointed a company officer and will serve on Elli's Executive Committee.

Zino succeeds former EDI president Richard A. Sperber, who was appointed president and chief operating officer of Environmental Industries, Inc.

Zino received his masters in business administration from Harvard Business School and holds a BSBA, cum laude, in accounting and computer science form Georgetown University. Zino currently serves on the Board of Directors of the Los Angeles Philharmonic and the Board of Advisors of Arizona State University's Center for Services Leadership.

"Meteorlogix" New Name of DTN Weather Svcs.

DTN Weather Services, also known as Kavouras or WSC, is now known officially as Meteorlogix.

As the world's largest commercial weather services provider with more than 22,000 customers, Meteorlogix delivers weather services that enable companies to manage weather-related business risks and minimize financial loss.

Meteorlogix offers a range of services targeted to meet the various weather information needs of a wide variety of industries.

Lowe's to Serve as Cub Cadet's Exclusive Outlet

Lowe's Home Improvement Warehouse and Cub Cadet have formed a strategic alliance in which Lowe's will serve as Cub Cadet's exclusive home improvement retailer of its outdoor equipment. Cub Cadet manufactures heavy duty lawn and garden tractors with features that include solid steel drive shafts, welded steel frames and cast iron front axles. Cub Cadet will appear in Lowe's stores in spring 2002.

Student Career Center Returns to Mid-Am

The Student Career Center once again returns to the Mid-America Horticulture Trade Show (Mid-Am) for 2002.

An annual event, the Career Center takes place on Thursday, Jan. 17 in Wauconda, Ill.

The event is held concurrent with the Mid-Am Trade Show.
Hydraulic StumpBuster for Skid Steer Loaders

Shaver Manufacturing unveiled the newest addition to its lineup of StumpBuster tree stump cutters. The skid-steer loader mounted SC-50-H StumpBuster is designed for contractors, landscapers and maintenance departments looking for a simple, efficient, highly-maneuverable solution to tree stump removal. It is powered by a minimum 25 gpm high-flow hydraulic hook-up and can cut up to a 45-inch diameter stump 12 inches below ground in a single pass without repositioning the unit. The skid-steer loader-mounted cutter allows the operator to maneuver around buildings, storage sheds, fencerows or trees to eliminate a single large-diameter stump, or clean-up a whole grove. All operations can be performed without leaving the loader seat. Shaver uses the “Fast-Tach” system for hook-ups. For more information, Shaver Manufacturing, PO Box 358, Graettinger, IA 51342, call (712) 859-3293, fax (712) 859-3294 or visit www.shavermfg.com.

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DuPont OustXP

XP technology is a production technique aimed at increasing the solubility of DuPont products and creating a more consistent, uniform spray coverage, leading to better weed control. The XP formulation is designed to improve the resuspension of products and thus reduce clogging and pump problems while increasing the amount of herbicide reaching weeds. For more information, contact DuPont Crop Protection, (302) 774-1000, fax: (302) 992-2474 or visit www.dupont.com/ag/vm.

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Fitch Fuel Catalyst (F4-T)

The Fitch Fuel Catalyst (F4-T), manufactured by Advanced Power Systems International, is designed to help reduce emissions while increasing power and fuel economy in all self-propelled outdoor power equipment. The F4-T is formulated to work on lawn mowers and on other outdoor equipment with horsepower greater than 3.5. The Fuel Catalyst, which involves only one application, is a permanent fuel treatment device for gas, 2-stroke fuel, or diesel. It does not dissolve and is not absorbed by the fuel; rather, it induces an electrochemical reaction on the degraded elements of fuel to increase the percentage of higher energy fuel components. For more information, contact Advanced Power Systems International, 1-888-881-APSI or visit www.fitchfuelcatalyst.com.

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Brown Bear BC283 Brush Cutter

Brown Bear Corporation has introduced a scaled-down version of its self-propelled brush and tree shredder as an attachment for skid steer loaders with high-flow auxiliary hydraulics. The Model BC283 utilizes the same size rotor, cutters and pins as used on the large machine. Field testing indicates the Model BC283 easily handles up to 3- to 4-inch hardwoods, with 6-inch being maximum, and easily cuts and shreds up to 6-inch softwoods such as evergreen. The BC283 will clear next to fence lines, pastures, wood lots and pipeline and utility right-of-way. For more information, contact Brown Bear Corp., PO Box 29, Corning, Iowa 50841, call (641) 322-4220, fax (641) 322-3527, or visit brownbearcorp.com.

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Arborjet Plant Injection System

Arborjet is a new tree and plant injection system. Originally designed to control the Hemlock Woolly Adelgid, this system delivers compounds directly into the tree using the smallest microinjection possible with minimal injury. The Arborjet system consists of an injection tool, an injection method, and customized organic products for plant health. The system is also designed to control insects and disease while improving plant vitality. Its applications are extremely versatile—from targeting exotic aggressive pests to controlling disease and augmenting plant vitality. It is effective with large and small deciduous, evergreen, and palm trees, as well as shrubs, vines and houseplants. For more information, contact Arborjet, Inc. at 2 Draper St., Woburn, MA 01801, call (781) 933-5602, or visit www.arborjet.com.

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Citrus Protector Net Bag

NSW Corp., a manufacturer of extruded plastic netting, has introduced the Citrus Protector Net Bag, plastic net mesh bags that help protect young citrus tree foliage and other plant foliage from damage caused by deer and other wildlife. The mesh bags offer this protection while allowing air, light, moisture and chemicals to reach the plant through the netting. The plastic mesh bags form a protective net layer that deters animals from feeding on small tree foliage. When animals attempt to feed on protected trees, they are put off by the foreign net cover and generally move on to easier targets. The bags are heat sealed at the top and are installed by simply slipping them over small trees. For more information, contact NSW, LLC., 530 Gregory Ave., Roanoke, VA 24016, call 1-800-368-3610, fax (540) 345-6793, e-mail netting@nswplastics.com or visit www.nswplastics.com.

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Root Grapple

The Root Grapple, designed and manufactured by Loflin Fabrication, LLC, is new to the skid steer industry. The Root Grapple can be used to sort and separate materials and to load logs, brush, rocks, demolition debris and other materials. Hydraulic cylinders operate independently for uneven loads. For more information, contact Loflin Fabrication LLC, 1382 Cranford Rd., Denton, NC 27239-8952, call 1-866-859-4333, fax (336) 859-5830, or visit www.loflinfabrication.com.

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When it comes to reducing wood and green waste for disposal, mulch or re-salable product, grinders are the top dogs, king of the hill— even if that hill is made of wood chips and shredded mulch. Unlike chippers, grinders are capable of reducing much larger, complete items such as trees, stumps, green waste, pallets, poles, railroad ties— even complete houses.

Though on the expensive side, grinders represent numerous payback opportunities for the commercial tree care company. Certainly, they reduce costs by reducing large wood/waste volumes and large individual pieces into low-volume mulch for the job site. However, for the truly entrepreneurial, they represent two potentially new income streams and possible profit centers.

First, the demands from municipalities to ban burning and yet reduce waste has created a concurrent demand for companies willing to contract to come to work and dump sites to grind up stumps, pallets and other waste for dispersal on-site or for less expensive hauling off-site.

Then there’s the actual production of valuable shredded mulch of various sizes, which can be colored and resold at a profit. Chipping material up to tree-size is one thing, but with stumps, root balls, brush, pallets and yard waste most likely being added to the mix, a grinder— not a chipper— may be necessary.

Of the two varieties, tub and horizontal, tub grinders are more prolific, though each has its advantages. The distinct difference is that with tub grinders the material to be reduced is lowered into a large, open hopper, vs. being fed onto a conveyor and through a horizontal rotating drum. Both offer models that can be run remotely, often by a single operator.

According to Dan Brandon, marketing manager for Morbark, Inc., which makes both types in various sizes (nine tub and four horizontal types), “Tub grinders are popular because they are productive and easy to work on and maintain. If the user can position the grinding operation in a controlled, remote area where bystanders are kept back at least 200 feet, a tub can be a good choice. However, because of the tendency for grinders to propel debris up into the air occasionally, users may want to consider a horizontal machine that can be
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Nine Heavy Duty Models
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operated in closer quarters, near streets and in residential areas. Horizontal grinders are better at containing flying debris and have the added advantage of being able to process longer material with less shearing or chain saw work.”

Brandon is currently working on a pair of projects that will demonstrate to arborists and help them focus on the value of the grinders’ end product—mulch. “With wood chips, there’s not much of a market right now,” he said, “and many arborists have to resort to spending to dispose of the ground-up waste. Ground-up mulch material has more value as an end product than traditional chips, and, by adding value, the arborist can turn waste into a profit center.”

Brandon explains how. “Our research has shown that if you are in the tree business and processing 40 yards of wood chips a week, even a smaller grinder can be put into operation that will pay for itself in the profit differential resulting from the added value.”

TCI found more than three dozen manufacturers of grinding units, ranging from very small, 100-hp towable units to stationary and movable units with up to the 1600 hp. These monsters are used primarily by large tree care and land clearing companies, construction outfits and municipalities.

Prices begin in the $75,000 range and can exceed a half million dollars for the more “strategic” units. Those numbers don’t take into consideration the cost of support equipment such as a front-end loader, track loader or excavator with a variety of bucket attachments — that are necessary even when the grinder is purchased with its own loader and grapple. Separate loading devices aid the arborist’s overall mobility and can cut costs by using multi-purpose machines, but manufacturers warn that the loader must be large enough to reach and dump comfortably into a tub.

At the top end of the scale, tub grinders that serve landfill and for-profit waste reduction and mulching production (green waste, demolition material and pallets) have capacities that can range from 50 cubic yards to 700 cubic yards of finished product per hour. These behemoths’ claim to fame is throughput.

Small- and medium-capacity grinders typically favored by contractors operating at multiple sites trade throughput for mobility and fast setup — usually less than two hours, even in remote and
PROBLEM: Economically Converting Waste Into Useable Products

SOLUTION: BANDIT

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- Low operation costs
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- Reduces green waste, leaves, brush, stumps, whole trees, pallets, C&D, railroad ties, new shingle waste, asphalt and more to a consistent end product of varying sizes and consistencies
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MODEL 3680 BEAST RECYCLER

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18” x 19” capacity chippers that will convert an 80' whole tree to chips in under a minute.

MODEL 280 BRUSH BANDIT®

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Disc-style chippers in 6", 9", 12", 14" and 18" diameter capacities are highly efficient and extremely versatile.

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rugged areas. Some are legal for ordinary transport, but wider grinders require special permits and carry possible additional restrictions. These small- and mid-size machines often are easier to set up than larger ones.

The key, of course, is to match the arborist’s needs with a unit’s typical capacity, grinding/shredding type, screen configuration, loader arrangement, durability of the grinder and need of support equipment and personnel.

Chris Nichols, product manager for the environmental division of Vermeer Manufacturing Company, says when it comes to tub grinders, “Preferred features are determined by the material to be ground up.” Screens are available with openings in a range of sizes, from 3/4 inch to 10 inches, allowing you to choose one that will produce the desired size for your end product.

“The processing of light green waste, grass or leaves may require a different machine configuration for optimum efficiency than heavy grinding such as land-clearing debris, logs or stumps,” explains Nichols. “Creating marketable products like compost or mulch and also for grinding large stumps and trees, one needs to consider a variety of hammer types and screens with different size openings. Many tub grinders offer hammer and screen flexibility, but the degree of versatility varies with each machine.”

Nichols offers some words of caution to arborists who use loaders to feed machines. “If you are grinding trees, stumps, green waste, pallets or poles, you may want to use a grapple attachment on your loader to grab the material and shake out any dirt before loading. When dirt and sand are dumped in with raw material, maintenance costs can increase four to five times due to premature wear and subsequent replacement of hammers. You also have a better chance of lowering your maintenance and replacement costs on your hammers and screens if you use a loader or excavator with a rake bucket that has a bottom plate with spaces for the dirt to fall out. When using a tub grinder with its own loader and grapple attachment, what you give up in mobility, you gain in operator visibility and precision loading technique,” he maintains.

For the mulch maker, chips are well marketed in some areas, but to manufacture today’s increasingly popular shredded landscape mulch, a hammermill style grinder may be the better choice—along with a mulch coloring unit.

Grinder makers say that hammers and tooth insert selection should be guided by the type of material being ground and the desired size and shape of the end product. Broad, block-faced, fixed and bell-shaped hammers are effective on light green waste, grass, leaves and re-grinding of material. They beat the material and force it through the screens for sizing. Limiting these hammers to use on such materials will optimize operating costs, manufacturers say.

Brush, pallets and other light materials (such as Christmas trees) that don’t have sufficient weight to carry themselves down into the hammermill are handled best by hammers with pointed teeth inserted into them. This combination creates an aggressive ripping action that helps pull the material into the hammermill and grind it efficiently. Further, manufacturer studies show that as the teeth wear, they become more pointed, and thus, more productive. In contrast, block-faced hammers perform best when they are new.

To carry the ground material away from the grinder’s business end, some tub grinders use a combined auger/belt conveyor system, while others use a dual belt con-
veyor system to carry the ground material into a discharge pile. For most machines, there is a limited amount of space under the hammermill for discharging the ground material. A dual belt conveyor system generally offers higher discharge capacity for the limited area under the hammermill than an auger type discharge system. The auger/conveyor system throws spoil from the hammermill into a trough, from which it is augered to a conveyor belt.

Warren Watson of Watson Tree Service in Niles, Mich., originally purchased a tub grinder for one purpose – grinding waste. He found that there was money in producing mulch from what he called “arborist’s chips.”

Watson’s Vermeer tub grinder reduces waste wood and green products, in addition to leaves, grass trimmings and brush. By culling and blending the woods that go into the hopper, Watson ends up with a highly saleable, uniform product that can be made “shreddier” or can be lightened or darkened depending upon the kind and age of the wood that is ground up.

“We have a have a coloring process that lets us grind our waste wood (even taking in waste from industry), then colorize it for commercial resale,” says Watson.

He advises others that, “smaller units work fine, they just take longer.” He also suggests that smaller operations with land available might want to store up a year’s debris and then rent a large unit to grind it all up at once.

Karl Smith isn’t an arborist. He’s in the real estate business in Colorado, yet he swears by his tub grinder for helping to knock out 60 percent of the trees to create clear-corridor-view building lots from the “lodge pole,” heavy-forest growth in that part of the world.

“I needed a unit that I could take to the job site and that left the property fairly clean.” His Morbark is like a blunt instrument that beats – not chops – the wood, (and sometimes rocks and rooted dirty material) into a mulch that improves the value of his lots.

Major manufacturers like Morbark offer tub grinders all the way up to the Model 1500, whose 950-1050 HP Caterpillar or Cummins motor can produce up to 500 yards of material per hour. Bandit Industries manufactures two horizontal grinders: the towable Model 3680 Beast Recycler (intended for landfill/waste reduction use) and the self-propelled Beast for off-road use. It’s suited for processing sawmill and logging waste. In one case, the Beast Recycler was processing about 40 tons of sawmill waste per hour, turning about 97 percent into 2-inch material. (Its newest application is processing roofing shingle as an additive to asphalt.)

Also on the horizontal grinder side, Fecon, Inc. has units that can safely feed stumps up to 18 inches in diameter as well as yard, construction and demolition waste. A feature of the company’s MZA grinders is that since they are “designed for multi-usage sites, the MZA is transported easily with no special permits at speed of up to 50 miles an hour. One operator can have the machine operational within minutes of arrival on site.

Before you decide which unit is best, you should have a look at market conditions for resale in your area. Calculate how much wood waste you generate, what type it is, what you can sell it for, and what extra costs in equipment and manpower will factor into your decision. A grinder, even a small one, isn’t for every tree company. But it can be profitable if the market and the company are organized and positioned well.
Tree Society Promotes Arborists

By Don Dale

Listen to what Angee Beckett says about the West Hollywood Tree Preservation Society (WHTPS): “It sounds like an old lady’s garden club. But it’s anything but that.”

What an understatement. WHTPS, which was founded in 1998, has become a force to reckon with in this small city that is, well, west of Hollywood, Calif. The society has not only taken on some tough tree issues (and gotten good results!) — it has also been promoting proper tree care. Education is the focus of this particular tree society. And because education brings about better care and maintenance of trees, that brings business to arborists.

“We have to educate the public, cities and tree maintenance companies,” says Beckett, who is a movie and television costume designer by trade. She points out that she knew almost nothing about trees, even though her yard is filled with them, until she became involved in local battles over trees. Now her society is embarking on a publicity campaign involving billboards and video spots that can be seen nationally.

By her way of thinking, education means more work for arborists because non-professionals use terrible pruning and maintenance practices. Flagrantly improper practices ruin a lot of trees, and this example is followed by homeowners who prune their own trees. Seeing city maintenance crews topping trees along a public street, for example, may encourage homeowners to hire unqualified crews to do the same to their trees.

Beckett’s story seems a fairly stereotypical one in California. She was infuriated when a neighbor hired a crew to cut down a huge, 90-year-old deodar cedar that was an icon in the neighborhood.

“I was really upset,” Beckett recalls. Although she failed to save the tree, her protests to the city led her into the weird labyrinth of ordinances that make up this urban area’s attitude toward trees.

She not only began noticing other tree-related issues around town, she also began educating herself about trees. A native of Sacramento who has lived in southern California for 20 years, Beckett has always been a tree lover who knew virtually nothing about their care.

“I didn’t even know the term ‘urban forest’,” she admits. She estimates that before she woke up to trees she could identify about two dozen of them. Now she estimates that she can identify about 150.

After Beckett lost her first tree battle — she got city and media attention by throwing herself against the cedar tree and delaying its demise – she began her journey by educating herself on urban heritage tree status and legislation in the West. The deodar cedar, 70 feet tall, was a landmark tree in her neighborhood, and she was furious that such trees on private land could be removed.

“I got notoriety for being the tree lady who stepped in front of a chain saw,” she says, but that didn’t do her a lot of good. “I knew nobody.”

So, early in ’98, as she expanded her research into heritage trees, she learned from the California Department of Forestry that an inventory of the trees of West Hollywood was needed. She applied for a grant from the state to do that inventory, and in 1999 the state awarded $5,500 for that purpose.

“We needed a name on the grant application,” Beckett recalls, so she and another volunteer came up with a name for their fledgling organization: The West Hollywood Tree Preservation Society. She was physically involved in that tree inventory with other members of the society.

In the meantime, also in 1998, the city of West Hollywood was planning to cut down all the trees along Santa Monica Boulevard as part of a street widening and road redevelopment project. This was a long-term project with high visibility, and Beckett wanted to save many of those trees — especially older ficus that were part of the beauty of the city.

“It was a bloody fight,” she recalls. Members of her still-unnamed society chained themselves to trees to save them. They lost the fight, and the trees, but did win one small battle. The city had wanted to plant small London plane trees in place of the ficus. The group convinced them to plant non-
deciduous Chinese elms instead. "By this time, people who were also concerned about trees were calling me," Beckett says. She and her group were becoming "lightning rods" for tree causes in the area. With all the publicity that surrounded her tree preservation battles and the inventory, Beckett began signing up members. The non-profit society is still small by any standard, but it now has 25 very active members and 15 less active ones.

Another of her campaigns has been against tree topping. She has pressured the city maintenance department to discontinue topping by a city contractor because of its injurious effect on trees large and small.

Beckett pitched a fit when she found the city was going to top its newly planted Chinese elms. The public furor led to a more sensible pruning program, but it has also led to a love/hate relationship between the society and the city. The city calls her to deal with citizen inquiries about trees, but they hide when she takes after them because of poor tree care practices.

"The state doesn't want state money used for topping trees," she says, so she uses that leverage to stop topping paid for by state funds. But early on, Beckett saw that the society should not just become a confrontational organization known for stopping chain saws. She saw its strength in its ability to educate people about tree issues. That would give a lot more power to the tree preservation movement.

Accordingly, in 2000 she pursued, and a year later obtained, a $15,000 grant to create three public service TV spots promoting urban forests. Those were produced during the summer of 2001 and are scheduled to be released late in the year.

"They're educating people about the importance of trees," she says. Those TV spots were designed for a California audience, but will be distributed nationwide in an attempt to reach a wider audience. "Getting the word out is the only way we'll be able to get people to understand."

Beckett says she called in 20 years worth of entertainment industry favors to get the job done for $15,000. In her energetic fashion, she is having a Hollywood premier of the TV spots at a fashionable restaurant.

"We will be inviting all the network heads," she says. She wants to make sure these spots find a place on TV so they'll air them at decent times."

Another major project, especially for so small a group, is WHTPS's catchy "GOT SHADE?" billboard. Correction. At first it was only one billboard, situated in a prominent location in this upscale city, but Beckett has plans to turn it into 25 billboards.

She has several outdoor billboard companies lined up to donate billboard space all around southern California promoting trees and the urban forest. Some will have the "GOT SHADE?" message, but there will be other messages as well. Beckett is lining up other businesses to pay for the design and production of the messages — at $450 per billboard.
Another campaign relating to billboards has been her attempt to stop the secret topping of trees that happen to be in front of billboards. "Midnight bandits" were topping the trees after hours, and the city now offers a $500 reward for information leading to the identity of those people responsible.

Another, more subtle, means of propaganda is her push to get West Hollywood political forces behind the society. She already has a city councilman on her nine-member board and one who is a society member. She also tries to recruit arborists to her cause, and she boasts certified arborist Sylva Blackstone on the board.

"I'm really impressed," Blackstone says of WHTPS's accomplishments to date. She emphasizes that it's not just a society of radical tree huggers, but a group of people actually defending and promoting the urban forest.

Blackstone advocates that arborists everywhere should support groups like this - not only because of the good work they do, but because they actually create work and improve the image of professional tree care people.

"It's a really good thing for arborists to get involved in," she says when asked if arborists are happy to see such radical "out there" organizations. She points out that there is a lot of very bad tree maintenance going on, in West Hollywood and elsewhere, and arborists should be appalled.

She supports Beckett's assertion that by stopping city and landscape company crews from hacking up trees in the name of tree care, the public will have a better chance of learning how trees should really look. That brings new work to the people who know how to prune a tree correctly.

Certainly, Blackstone says, she has gotten a lot more tree care calls since the society came on the scene. She adds that although relations with the City of West Hollywood are rocky at times, there is also an underlying spirit of cooperation developing "because we all want the same thing."

As to the larger goal of the society, Blackstone notes that there will be many more trees in the urban forest if organizations like this proliferate and prosper. She shares Beckett's conviction that the urban forest is declining, particularly in regard to larger heritage or landmark trees. WHTPS has slowed that trend in just a couple of years.

"They've gotten more trees in the ground. They've protected the trees we have," she says of the society's work in West Hollywood. Ultimately, that also leads to more work for qualified arborists. Not that Beckett prefers all full-time arborists to those who only prune trees as part of their other jobs. She doesn't hesitate to criticize arborists who "sell out" by pruning trees the way they are told to by cities or developers.

"Don't buckle in to the customer," Beckett says. "The customer should be looking for arborists to do it the right way. We also want arborists to educate their clients."

Beckett now describes herself as a "well-educated urban forester." She coordinates with other tree organizations around the country and in October hosted the organizational meeting of the Southern California Regional Urban Forest Council. The meeting boasted industry representatives from conservation organizations, landscapers, city urban forest workers, political representatives, and representatives from fertilizer companies. Amazingly, the Los Angeles area was one of the few major cities in the state without an urban forest council, and Beckett set about to remedy that. "We need an umbrella organization," she points out. "I was on the phone for six months," she recalls.

"Seventy to eighty percent of the people on this planet live in urban areas," Beckett points out. Since trees provide so many benefits, from beautification to carbon dioxide and particulate removal, it behooves the inhabitants to plant and care for trees, she says. And the West Hollywood Tree Preservation Society is moving them steadily in the right direction.
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TREE CARE INDUSTRY - DECEMBER 2001
Controlling the rising costs of employee benefits is a challenge that never seems to get easier. While the recent spike in health insurance premiums has gotten the lion's share of attention, the fact remains that business owners must consider the impact of the full range of worker benefits, which as a group comprises 37.2 percent of the average payroll, according to the U.S. Chamber of Commerce.

Doing away with benefits, of course, is not an option. Hourly workers and salaried staff demand good benefits as part and parcel of the employment agreement. Your challenge is to offer attractive plans to keep your good personnel, while maintaining a healthy bottom line.

How can this be done? Start by making sure you aren't paying for benefits your staff doesn't need. "Being all things to all people is more expensive than narrowing in on what people really want," recommends Robert Dughi, president of CitiStreet, a defined contribution plan provider based in Quincy, Mass. "Survey your employees about their wants, and listen to what they say. Put your energy where there's 'value added,' as opposed to offering a little bit of everything."

BOTTOM LINE
How to keep one from biting the other

By Phillip M. Perry
Web to the rescue

Your goal is to select the most affordable quality plans, and then administer them as cost effectively as possible. Technology can help.

"A number of new Web-based services offer plans and quote prices, so certain choices can be made over the Internet," explains Tim Harrington, a principal with William M. Mercer, a Chicago-based consulting firm that has tracked benefits costs for over 25 years. The automation inherent in the Internet allows Web-based services to offer comparison-shopping of products from a broad range of carriers. They can also reduce the overhead involved in processing employee claims, educate new employees on your benefits plans, and answer common questions.

"In many cases these services allow employees to access information on the plans without having to call their human resources departments," says Vincent Gandolfo, senior managing director of Frank Crystal & Co., a national insurance brokerage firm based in New York City. Since the human resources department in most tree care companies is the company owner or the office manager, who juggles a number of other duties, this can save time and money as employees can view plan procedures and complete claims forms online.

Various Web services handle benefits such as health insurance and retirement plans, and offer clients the opportunity to create custom Web pages for use by their employees. (See sidebar "Internet Services.")

Retirement plans

With some 73 percent of employers

Saving on health insurance

The first step on the cost savings journey is to shift costs to employees. Cost sharing occurs when employees make greater co-payments, and/or pay higher annual deductibles, for services received. Many employers, for example, have replaced the traditional $5 office visit copay with $10, $15 or even $20.

Employees become more prudent consumers of health care when they pay a greater portion of the costs. At the same time, insurance companies fund less of the total annual health care expense. Both phenomena translate into lower risk for the carrier and thus lower premiums for the employer.

Employers may also save money by tailoring the plans to length of service, says Marcus B. Newman, an employee benefits consultant with GCG Financial, Bannockburn, Ill., a full-service financial firm that consults on health insurance matters. "I often recommend some sort of vesting schedule. If you can link how much you pay to the number of years of service, that will drive your employees to stay with you longer and you will have some form of cost control." You have to be careful how you roll this out, to avoid hard feelings. You can grandfather the program to protect your current workers, and institute a new practice for future hires.

Finally, says Newman, it's a good idea to offer more than one managed care plan. Some employers offer a Health Maintenance Organization (HMO) plan, and also a Point of Service (POS) plan that allows employees to go out of network. The employer funds most of the HMO plan, satisfying those employees who want to save money. Other employees who want to access a broader range of health services may "buy up" to the POS plan. As an employer you can offer your staff some price stability by having an HMO that may not increase as quickly as the POS plan in future years.

More employers are passing along the cost of drugs to employees, and for good reason. Prescription drug plans have seen the largest increase in costs of any component of health care. For some smaller employers, drug costs are rising 25 percent this year.

Recently companies have initiated three-tier programs, in which employees make copays of $5 for generic drugs, $10 for preferred formularies, and $15 for non-formularies. Other employers have started 10-20-30 plans. You can reduce your overall premium by three to seven percent, just by putting in a three tier program.
offering 401(k) retirement plans, it's important to look into anything that can help cut the shuffling of required paperwork, reduce the time involved with educating employees about their options, and take on the complex task of compliance testing to satisfy IRS guidelines. New Internet services offer to do this and more. One example is Success401(k), which maintains a service site at www.success401k.com.

"It's difficult for a small business to manage all of the activities that go into supporting a 401(k)," relates Linda DeLoreto, vice president of Success 401(k). "One important feature of our product is that it eliminates the paper reports and checks associated with traditional payroll contributions. All of the data are entered electronically." The system collects the money automatically from the payroll account.

How much does a system like this save? While Success 401(k) posts its price menu on the Web, DeLoreto notes that it's difficult to compare the pricing of plans because different plans break down their fees differently. For example, one plan may break out record-keeping fees while another buries them in its asset fees. "We know that Internet products are generally less expensive than products sold through sales people, but there are all kinds of variations," she says.

Beware the temptation to buy a 401(k) plan off the shelf without carefully considering alternative plans. "Most of these plans are being sold by brokerage and insurance companies, and because no one has sat down with the client to see what is an appropriate design, companies end up squandering money," cautions Joel Levy, principal with Benefit and Compensation Consultants, an actuarial benefits, compensation and human resources advisory firm in New York City. Comparison shopping is critical, since organizations that sell these plans can vary widely in terms of administration costs. Levy has seen such annual costs range from $1,000 to $35,000.

Life insurance

"Life insurance is very inexpensive to provide," says Levy. And it's also very popular: Some 89 percent of employers nationally offer this benefit.

Are plans pretty much the same when it comes to premiums? Not at all. "Life insurance is a commodity item," says Levy. "Employers should shop around for the best rate." A common error is to save time by purchasing different forms of insurance from the same broker, a practice that Levy says can be costly. Some employers take advantage of differences in prices by purchasing group life from one carrier and accidental death and dismemberment (AD&D) from another.

"Be aware that some life carriers have divisions that compete with each other," says Levy. "One division offers both life and AD&D, and another division may just offer just life."

The prices of the life insurance may differ in the two divisions. Lesson learned: Shop around. Don't have time to go comparison shopping? Get a good broker. Ask other employers which brokers have proven to be highly knowledgeable about carriers.
Workers' compensation

Workers' compensation is a mandated benefit that can make or break a tree care company. Premiums are increasing nationwide at about 10 percent to 15 percent annually, according to Stephen B. Paulin, senior vice president of Sullivan Curtis Monroe, an insurance brokerage in Irvine, Calif.

Premium increases are only part of your cost. Indirect costs can be two to three times as great. They include costs to administer a claim, supervisory time in investigating an accident, and lost time from the injured individual. Paulin suggests these cost-containment measures:

♦ Run physical tests for applicants. Run "range of motion" tests for applicants for jobs that require lifting, climbing and brush dragging.

♦ Improve your workplace. Adjust workstations to reduce claims that result from repetitive stress injury.

♦ Choose an experienced carrier. Don't just buy insurance from the carrier with the lowest price. "Choosing the cheapest carrier can end up costing you more when it does not handle claims properly," says Paulin. Instead, look for a company with a good claims-handling history. "Meet with the individuals who will handle your claims and determine their operating philosophy," says Paulin. "And get feedback from other businesses who have experience with that carrier."

You can also reduce your premiums, or keep them from increasing unnecessarily downstream, by taking some proactive steps. "Overcharges by insurance companies are very common," says Edward Priz, principal of Advanced Insurance Management, Riverside, Ill. To keep them from occurring, you need to audit your own classification codes to assure accuracy with the workplace conditions to which your personnel are exposed. You also need to make sure your experience modification factor is correct. Consider having an outside auditor review your records.

Disability income

Workers compensation protects your workers from financial disaster if they are injured on the job. But what if the injury takes place outside of work? That's where long- and short-term disability comes to the rescue. It can be a valuable benefit, offered by 68 percent of employers nationwide.

How can you control the rising costs of disability income insurance? To find out we approached Edward Muldoon, director of absence and disability management at the Washington Business Group on Health, an organization that assists businesses on this topic. He points to three key areas:

1. Institute early return to work policies. To save money, you want to encourage people to return to work as soon as possible. "The costs of a disability go far beyond disability payments and insurance premiums," says Muldoon. "Other costs include lost productivity, overtime for employees required to accomplish the missing person's work, and training time. Whatever you can do to return the employee to work quickly can..."
make a big difference."

2. To encourage early return, institute workplace programs that will accommodate workers who suffer from temporary disabilities. Many employers have these in place for staff members covered by workers comp, but have not extended the programs to cover people absent under short-term or long-term disability. Now is the time to do so.

3. Pick the right plan. "Look at your plan to see if there are any incentives for workers to stay home longer," recommends Muldoon. For example, some plans call for no payments unless a person stays out for two weeks, at which time the payments become retroactive to the first day. Under these plans, individuals often stay out longer because it is in their self interest.

4. Select your carrier wisely. Not all companies providing insurance are equal. Select a company that will help you increase your productivity by assisting injured people to return to work more quickly. Select a company that helps manage the duration of the disability. Ask the right questions. Do they spend money on rehabilitation? Do they have good medical resources? Do they have doctors and nurses on staff? What training do they give their people? Muldoon advises checking with other businesses in your area to find out what insurers they are doing business with and their level of satisfaction.

5. Finally, put disability insurance in context. It's all about productivity. You can push down cost by choosing a plan that is less expensive, but the result may be longer periods of time during which people are away from the workplace. The savings you pick up on health side can be cancelled out by losses on the productivity side.

Cohesive approach

Left uncontrolled, the rising costs of employee benefits can erode your bottom line and lead to staff discontent when draconian measures are needed to cap spiraling expenses. Take action now to review your entire benefits package. Survey your staff to find out what benefits they really want, in contrast with the benefits you have always assumed are most important. And finally, share information on growing costs with your employees. When employees know the effect that benefits have on the health of your company, they will be more willing to help by cost sharing and responsible utilization of benefits.

Rather than just react to a crisis such as rising health insurance premiums, it's important to conduct a total review of your company's benefits structure. Develop cost-effective benefits plans for the company that will be understood and appreciated by employees.
Why Do Trees Vary in Suitability to Insects and Diseases?

By Clive G. Jones

Introduction

There is a tremendous diversity of insects and pathogens on trees, including a very large number of species that can adversely affect tree growth, survival and aesthetics. Given that every insect herbivore and plant pathogen species on every tree species is a unique combination, it can be pessimistically argued that managing problems will always consist of specific local solutions that depend upon the tree species and its condition and the local environment. While I would never deny the critical importance of case-specific knowledge for managing these problems, in this series of three articles (See TCI October and November 2001) I argue that an understanding of general ecological relationships among trees and their consumers can do much to enhance management.

The articles summarize our current understanding of relationships among trees, their insects and pathogens, and the environment, showing how this understanding may be of use in arboricultural management. Patterns of insect and disease attack on trees have relatively orderly and predictable underlying ecological causes. These causes indicate that it may be possible to risk-rate trees and situations most likely to lead to problems, and suggest management strategies based on those causes that might help reduce the risk, frequency and severity of insect and disease problems.

In the first article I asked: What keeps trees free from attack by insects and diseases? On average, insects and pathogens were relatively rare on plants, generally causing low amounts of damage. Although the natural enemies of insect herbivores (but not pathogens) and the weather do play an important role in keeping these organisms rare, the inherently low quality of tree tissues as food may well be the most important factor. Trees have low and very variable nitrogen content, a critical nutrient for insects and pathogens, and they contain a diversity of physical and chemical defenses that collectively make the extraction and processing of this limited and variable nitrogen difficult, dangerous and costly. By keeping tree tissues low in nitrogen and high in defenses, arborists may be able to reduce the frequency and severity of insect and pathogen problems on trees.
and that increases in food quality play a key role in causing outbreaks on trees. We have focused on explanations that can be applied to trees in general. But of course, the fact that most trees are green most of the time does not mean that all trees have the same amount of low-level damage, nor does it mean that outbreaks result in uniform amounts of damage to all trees. In reality, there is considerable variation in the amount of damage from tree to tree within and between species. During outbreaks, some trees are untouched, some are lightly damaged, while others are heavily attacked. These patterns occur both within and between sites for trees of the same and different species. Is this variation in consumer abundance from tree to tree and species to species idiosyncratic and unpredictable, or are there orderly patterns to this variation?

We have also seen that food quality can be expressed in terms of the relationship between tissue nitrogen and defenses, where high food quality generally equates to high concentrations of tissue nitrogen and/or low concentrations of defenses that make the extraction and processing of this nitrogen difficult, dangerous and costly. If food quality plays such a key role, and if we know in general terms what constitutes poor food vs. good food, then is it possible to predict whether or not a tree species or individual is likely to be good or poor food? Can we predict whether or not a particular tree species or individual in a given environment is likely or unlikely to increase in food quality in response to altered environmental resources, abiotic stress or damage?

The short answer is that tree growth rate within and between species is a primary determinant of tree food quality to insect herbivores. This may well be the case for plant pathogens, but as yet, we have less evidence that this is so. There are four ways in which the growth rate of trees is related to food quality.

Tree growth rate and food quality

Inherent growth rate and food quality

The first relationship involving growth rate relates an intrinsic measure of tree growth potential called the inherent growth rate to the baseline food quality of trees and the abundance of insects and pathogens. Tree species and genotypes can be characterized in terms of their inherent growth rate - a measure of the maximum growth rate that a tree species attains when unlimited resources of light, water and nutrients are made available. Inherent growth rate can be measured by growing saplings in common gardens and can be compared across species. Tree species show a wide range of values for inherent growth rates, but here I will just contrast extremes of an inherently fast-growing vs. an inherently slow-growing species and how this relates to food quality for insects and pathogens.

Inherently fast-growing species show marked, rapid increases in growth in response to the addition of light, water or nutrients. They are very responsive to changes in the availability of environmental resources, and very responsive to environmental stress and damage. In contrast, inherently slow-growing species are largely unresponsive to changes in the availability of environmental resources or environmental stress and damage. The
marked differences in the maximum growth rates and the degree of environmental responsiveness between these two plant categories reflect a fundamental trade-off. Plants can either grow rapidly or they can protect themselves heavily, but they cannot do both simultaneously.

The trade-off between growth and defense can be used to understand relationships between inherent growth rate, the baseline food quality of different tree species (i.e., the degree to which food quality is better than the lowest quality), and patterns of insect herbivore and plant pathogen abundance (Table 1). Inherently fast-growing species have made a commitment to rapid growth. This “live fast, die young” strategy is well suited to resource-rich, stress-free environments where competition for light and space is intense. Rapid growth in resource-rich habitats allows these species to out-compete slower-growing neighbors, become mature, reproduce, and then die after their inherently slower-growing, longer-lived competitors eventually catch up and overtop them. However, rapid growth is a resource-demanding process requiring high nitrogen in leaves for high rates of photosynthesis and high rates of new leaf production. Most carbon from photosynthesis goes into growth. As a consequence, inherent fast growers store few resources, have low root-to-shoot ratios, and have short-lived tissues. Since these species do not have the resources to both grow fast and invest heavily in defense, their leaves and woody tissues are low in fiber, lignin, tannin and other defensive chemicals, and the tissues are relatively high in nitrogen. So inherent slow growers are generally of the lowest food quality to consumers. Good examples of inherent slow growers include some oak species, and the Kauri of New Zealand and *Aurucaria* species of Chile that have leaf longevities of 10 to 20 years.

Some of the very first research showing the relationships among tree-inherent growth rates, leaf longevity and food quality to insects found that as leaf longevity increases, tannins and fiber increase. In other words, food quality declines as growth rate declines and leaf longevity increases. As growth rate increases, defenses decline. This relationship has been confirmed from numerous studies.

Compared to inherent slow growers, inherent fast growers are also more likely to support higher densities of insects, have more rapidly growing populations of these organisms, and experience higher amounts of tree damage. The same type of relationship might be expected to hold for pathogens, however, to my knowledge, the relationship has not been investigated.

**Inherent growth rate, environment and food quality**

The second relationship involving growth rate relates environmental variation to changes in food quality and the likelihood of insect and pathogen outbreaks on tree species with different inherent growth rates (Table 1). Again I will contrast extremes of an inherently fast-growing vs. an inherently slow-growing species. The trade-off between growth and defense can also be used to understand the relationship between inherent growth rate, phenotypic plasticity, and the degree to which food quality is likely to change in response to changes in the availability of resources, or the presence of stress or damage. As pointed out above, the “live fast, die young” strategy requires that growth, development, and physiology be very responsive to changes in the availability of environmental resources, and very responsive to stress and damage. Consequently the tissue biochemistry of inherent fast growers is also very responsive. As a result, the food quality of these species has a high likelihood of changing in response to variation in resources, stress and dam-
age. This does not mean that all changes in conditions lead to increased food quality. Some conditions — those increasing tissue nitrogen or decreasing defenses (e.g., fertilization) — will increase food quality, whereas other conditions will decrease food quality. The particular outcome will depend upon the type of environmental change and the way that the tree species responds to these changes. Variation in environmental resource availability, stress, and damage will generally result in variation in food quality for inherently fast-growing tree species.

In contrast, inherently slow-growing species do not respond markedly to the addition of light, water or nutrients. The “live slow, die old” strategy requires growth, development, physiology, and tissue biochemistry to be relatively unresponsive to changes. Consequently, the tissue biochemistry of inherent slow growers is also unresponsive, and so the food quality of these species has a low probability of changing markedly in response to variation in environmental resources, stress and damage.

These basic differences between fast-growing species and slow growers have important implications for the likelihood of outbreaks of insects and pathogens for those outbreaks that are caused by increases in food quality. (These arguments clearly do not apply to outbreaks caused by natural enemy declines or direct effects of the weather.) We should expect to find a higher frequency of insect and pathogen outbreaks on inherently fast-growing species than inherently slow-growing tree species. While eminently plausible, explicit tests of these relationships between outbreak frequency and inherent growth rate have yet to be made.

Realized growth rate, environment and food quality

The third and fourth relationships involving growth rate derive largely from the previous two relationships. They relate the realized growth rate of inherently fast-growing tree species to food quality and consumer abundance, and environmentally induced variation in food quality and consumer outbreak potential (Table 1). In essence, these are essentially extensions of the inherent growth rate concept applied to the actual growth rate of plants in a given environment — the realized growth rate. Since, as I have pointed out earlier, inherently slow-growing plant species have relatively invariant growth rates and food quality, these relationships really only apply to inherently fast-growing, phenotypically plastic species. Again, I will exemplify with the extremes, in this case an inherently very fast-growing species such as cottonwood or willow, growing across the broadest range of realized growth rates. So here the trade-off between growth and defense is being applied within a given species for trees growing under different environmental conditions, as opposed to comparisons...
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between different species in the same or different environments.

As the availability of environmental resources increases, individuals of inherently fast-growing species usually respond by increasing their growth rates. The increase in growth rate creates a demand for carbon and nitrogen resources, requiring the commitment of high concentrations of nitrogen in leaves to support high rates of photosynthesis, new leaf production, and root growth for exploration of the soil. Most of the carbon from photosynthesis goes into growth and, as a consequence, rapidly growing plants often store relatively few resources. Since fast-growing individuals do not have the resources to both grow fast and invest heavily in defense, the concentration of fiber, lignin, tannin, and other defensive chemicals tends to decline as growth rate increases.

At the same time, increased allocation of tissue nitrogen for photosynthesis often results in an increase in tissue nitrogen as growth rate increases. The end result is that food quality to insects and pathogens often, but not invariably, increases as growth rate increases. The caveat of "often, but not invariably" arises because under some circumstances the increase in plant biomass associated with increased growth can end up diluting the concentration of nitrogen in tissues unless nitrogen uptake rates from the soil keeps pace. Nevertheless, numerous studies have now shown a positive relationship between food quality to insects and the growth rate of inherent fast-growers in response to increased resources. Far fewer studies have been conducted with plant pathogens, but there are examples showing similar relationships.

We should also expect that the higher the realized growth rate, the greater the probability that stress and damage will result in outbreaks - provided trees are not growing at their maximum growth rate (i.e., environmental resources are still limiting, which is usually the case). The somewhat complex rationale is as follows: It is clear that any environmental stress and damage that decreases food quality reduces the likelihood of an outbreak, irrespective of realized growth rate at the time of stress or damage. However, it seems reasonable to suppose that as the realized growth rate increases and food quality increases, any environmental stress or damage that results in yet further increases in food quality has a higher likelihood of raising food quality high enough to cause outbreaks. As far as I am aware, this possibility has not been evaluated.

In summary, the answer to the question

<table>
<thead>
<tr>
<th>Tree Characteristic</th>
<th>Inherent Growth Rate</th>
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<td></td>
<td>Fast</td>
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<tr>
<td>Growth Strategy</td>
<td>Commitment to growth</td>
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<tr>
<td></td>
<td>&quot;Live fast, die young&quot;</td>
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<tr>
<td>Environment Type</td>
<td>Resource-rich, stress-free</td>
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<tr>
<td>Plant Competition</td>
<td>Strong</td>
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<td>Nitrogen Demand</td>
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<td>Carbon Allocation</td>
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<td>Stored Reserves</td>
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<td>Root/Shoot Ratio</td>
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<td>Leaf Tannin</td>
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<td>Tissue Defense</td>
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<td>Sensitivity to Resource Availability</td>
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<td>Sensitivity to Stress &amp; Damage</td>
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<tr>
<td>Variation in food Quality</td>
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<tr>
<td>Insect Herbivory</td>
<td>High*</td>
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<tr>
<td>Pathogen Attack</td>
<td>High*</td>
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<tr>
<td>Insect &amp; Pathogen Outbreak Potential</td>
<td>High*</td>
</tr>
<tr>
<td>Examples</td>
<td>Willows, Poplars</td>
</tr>
</tbody>
</table>

Table 1. Comparative growth, physiological, biochemical and ecological characteristics of inherently fast-growing and inherently slow-growing tree species.

* Plausible hypotheses about patterns that have yet to be widely tested or generally confirmed.
of what causes trees to vary in suitability to insects and diseases, is that tree growth rate— inherent and realized, within and between species—appears to be a primary determinant of food quality to insects and perhaps pathogens.

Tree growth rate and arboriculture

If tree growth rate largely determines food quality to insects and pathogens, and if food quality is a primary determinant of insect and pathogen abundance on trees, and if increases in food quality are a primary cause of insect and disease outbreaks, then it may be possible to use tree growth rate as an insect and disease management tool. A number of possibilities are worth considering.

Knowledge of inherent and realized growth rates might be used to risk-rate tree species, individual trees, sites and environmental conditions for potential insect and disease problems. For example, we might expect the highest risks to be found among inherent fast growers in resource-rich sites with environmental conditions that are most likely to promote rapid tree growth. Conversely, the lowest risks would be expected to occur among inherent slow growers, in the most resource-poor sites under a wide range of environmental conditions, including extremes.

It may be possible to reduce consumer damage and manage the risk of outbreaks by reducing growth rates. For example, could we reduce the risk by replacing inherent fast-growers with inherent slow-growers, or by shifting stand composition from dominance by inherent fast-growers to inherent slow-growers? Of course, any growth rate management plans would have to fit within overall tree management goals and existing pest management strategies. However, it may well be possible to make modifications to existing strategies for monitoring growth and tree condition, planting and replanting, pruning and thinning, managing plant succession, and managing soils, soil organic matter, nutrients and water.

An approach based on these general growth/food quality relationships is not going to be a precise, finely tuned tool. These types of ecological relationships, while sound, are nevertheless subject to many other sources of uncontrolled variation. Such an approach is best thought of as an adjunct to, not a substitute for, meeting the specific requirements of site, tree species, and the particular insect and disease problem. Nevertheless, the approach can take advantage of natural processes that are environmentally compatible, and some degree of augmentation of these processes might be accomplished at low or reasonable cost.

Let me end with posing some general questions that arborists may want to consider. Do current practices tend to promote high or low tree growth rates and the establishment of fast-growing or slow-growing species? What are the consequences of these current practices in regards to insect and disease problems? Would a growth rate management strategy be useful? How would it fit within existing management goals, strategies and practices? Could such a strategy be implemented? If so, where would it be most likely to work and what further information and research is needed?

Clive Jones is a research scientist at the Institute of Ecosystem Studies in Millbrook, NY. An ecologist, he studies how trees defend themselves against attack by insects and pathogens, how the environment affects tree defense, and what causes insect outbreaks.

Acknowledgments

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After the Show

Smart follow-through ideas to make the most of TCI EXPO

By Phillip M. Perry

Trade shows like TCI EXPO are great for discovering new products and making new contacts. All too often, though, business people return to mountains of backed-up work. Faced with the challenge of catching up on workaday tasks, they soon forget their good intentions to follow up with vendors, cultivate personal networks, and capitalize on industry trends revealed at the show.

It shouldn’t be that way. “What you really go to a trade show for is what takes place after the event is over,” says Francis J. Friedman, a trade show specialist and president of the New York City-based consulting firm, Time & Place Strategies. Successful TCI EXPO attendees share knowledge with staffs, place follow-up calls with the right exhibitors, and organize business cards and notes so they don’t end up on a shelf collecting dust.

But is attending TCI EXPO worth the effort in the first place, when so many products can be seen in full-color catalogs? Most people say yes.

“Show time is very well spent,” insists Joe Murtagh, president of The Source, Goshen, N.Y. “Where else can you have such concentrated exposure to such a vast array of information that is very well organized and presented? There’s nothing like being able to see the quality of goods and hold it in your hand.”

Given the benefits of trade shows, it’s clear that everyone will be attending more of them. Here are some techniques, then, for capitalizing on what’s learned at the show after you return home.

Share the wealth

If one piece of new information from TCI EXPO can help you make more profit, imagine the results if your whole staff could use the same knowledge when dealing with customers. Make sure everyone has an opportunity to benefit from the EXPO information, be it educational information from seminars, industry insights from business peers met in the aisles, or new product descriptions from the booths. The key is to disburse the information formally so that it is taken seriously.

Don’t forget that communication is a two-way street. Encourage your personnel to share insights that may enhance or alter your view of what happened at the show. This is particularly important when making decisions to take on a new line of goods or services.

“Your staff may know of products that are a better fit and should be compared and investigated,” notes Richard J. Brunkan, a partner at Humber, Mundie and McClary, a group of psychological consultants in Milwaukee. “You may discover that you were being overwhelmed by an enthusiastic sales person. People who work with customers can help you decide what’s there in terms of solid stuff.”

Once orders are set and delivery dates slated, assign duties to the various members of your team. What needs to happen before the goods arrive? Who needs to do what in terms of promotion and space planning? Where will you position the new goods and how can you clear space?

Good post-show follow-through depends to a great extent on advance planning. To encourage great work, make sure each attendee realizes a report will be expected back home.

“People engage in a very different level of note taking when they realize they will be held responsible for teaching others,” says Pittsburgh consultant Mina Bancroft. “They realize they will
really need to understand a subject.” Finally, assign a high priority to the meeting in which knowledge is shared. “Prior to attending the show, schedule the follow-up meeting on your calendar so it doesn’t slip between the cracks later,” suggests Bancroft.

Draw upon each person’s abilities when conveying information to your staff. “Because each person has unique strengths, each communicates in a different way and sees TCI EXPO with a personal perspective,” advises Donna Messer, a trade show consultant and president of ConnectUs Communications (www.connectuscanada.com), a consultancy in Oakville, Ontario. “Some learn by hearing; some by seeing; some by experiencing. So each person attending the show will describe what they saw in different ways to everyone back home. Encourage this and you will have one heck of a team.”

And how about those great seminars? Wouldn’t your whole staff benefit from knowledge gained? If one seminar in particular grabbed your attention at TCI EXPO, order the tape of the session by calling 1-866-827-3978 or at www.soundrecordings.org.

Speaking of communicating news to your staff: What can you do with all those notes you scribbled as you walked the aisles? In the rush of business they can fall through the cracks. Too often they end up disappearing into your filing cabinet.

Develop a plan to process those notes efficiently. Rather than enter all of your notes on a running series of pages, try dividing a notebook into sections by topics such as new products, personnel changes, industry trends, and government regulations. Back at your place of business, process the notes by removing the pages from your notebook and inserting them into a vertical hanging file organized by topic.

Follow through with vendors

Exhibitors can be as forgetful as buyers when the trade show glitter has faded. If they move on to other things and fail to send promised information, everyone loses. Smart business owners will mark their calendars to remind laggard vendors.

There are three benefits of prompt follow-through with vendors. First is the reduced risk of misunderstanding. Your memory of what an exhibitor said may differ from that of the vendor’s, and the latter may forget a deal that was not put in writing because of the rush of people at the show. So call and nail down your agreements. Second, calling can confirm schedules for on-site visits by vendor reps.
Finally, you can avoid the disappointment that can arise when you wait too long to place orders. Many manufacturers are trimming production in response to a softening economy, so late buyers may have to stand in line behind early birds, or even be left out of the pipeline entirely.

Vendors offer a stack of brochures and catalogs as you walked the aisles. That pile can seem so overwhelming that you avoid looking at them for months. Next year, ask vendors to mail catalogs and brochures to you.

The TCI EXPO Pocket Program can also fill a need long after it has served its original function as a trail blazer to booth locations. “The program is a wonderful resource with great shelf life,” says Lori Kurschner, vice president of marketing for the Dallas Market Center. “It can be referenced for contact information throughout the year.” And in yet another post-show resource, Kurschner points out that many venues now host Web sites with “market planning tools” that can help track the elusive supplier in the months after a show. Because many such sites are searchable electronically, buyers can quickly find sources of supply for specific lines.

Finally, how about all those business cards collected during the show? Try categorizing business cards on a scale of one through four, with “one” being the most important to contact. Back home, make sure you call the “one” cards first. “I advocate writing relevant information on the back of the cards rather than on a separate paper,” says Brunkan. “That avoids having to match things up at the office. On each card, note what was interesting about the product and what needs follow up.”

Find out what lies ahead
TCI EXPO 2002 in Milwaukee

Maybe you can’t forecast the future, but you can set the stage for your success by spotting important trends. “An entire industry comes together for a trade show,” says Francis J. Friedman, a trade show specialist and president of the New York City based consulting firm, Time & Place Strategies. He suggests doing these things next year at TCI EXPO 2002 in Milwaukee:

* Converse with booth staffers. Don’t just stop by and say “hi.” Watch for slow periods and introduce yourself for a chat. “Remember – they talk with everyone,” says Friedman. “You’ll be surprised what you hear.”

* Establish networks with peers. Build a community of like-minded, non-competing business owners in various towns, then follow up with them regularly through the year. Include people in other industries, because trends tend to migrate.

* Benchmark. Are you up to speed or ahead of the curve in management practices and equipment? Keep asking this question as you attend seminars and visit exhibitors.

* Meet the press. Few attendees think of interviewing business editors who are at the show, but Friedman highly recommends it. “If you can meet with an editor, spend a moment finding out what that person sees as the key trends in business.”

Concludes Friedman: “Curiosity should be something you bring to the show,” says Friedman. “Take full advantage of this information-rich environment.”

that’s because it is. Trade show experts encourage such relationship building. “When an attendee actually follows through with vendors met at a show, a light goes on with suppliers,” says Messer. “They say, ‘This is one I want to keep.’ You have brought to the attention of exhibitors that you are different.”

The results can be beneficial. “Down the road, you may be called for a testimonial, or you may be offered something to try out because you have been responsive,” says Messer. And, of course, you will be the first to know of any buying opportunities.

The squeaky wheel rolls farther down the road to success. “If you are lazy and don’t follow up, you will be treated the same way,” notes Friedman. If you establish a dialog, on the other hand, you become a partner for mutual profit rather than just another name on a customer list. “We are in an era of relationship building, but the hard part is that we are hiding behind our e-mail and phone systems.”

As the comments in this article suggest, getting the biggest bang from the buck invested in attending TCI EXPO depends on how you sweep up after the dust has settled and the glitter has faded.

“When you get back to your place of work, the important thing is to have a plan in place that prioritizes the information you’ve obtained,” explains Bancroft. “I suggest that you start processing the information while you are still at the show, and especially as you travel back home. Ask yourself, ‘What is the top thing I have learned and what will I do with it?’”

In other words, to tackle the big pile if new information efficiently, break it into manageable pieces. “If you end up with information overload, you will not be able to process any of it,” says Bancroft.

The more you keep your goals in mind, the more successful you will be as an EXPO participant. Cultivate the employee, the exhibitor and the customer who as a group form a “three-legged stool” of post-show success. If you take careful aim at your target and follow through with a good after-show swing, you’ll land a business owner’s favorite “hole-in-one” – more profit on your bottom line.

Bancroft
synergy (sin'ər jē), n., Combined action whose total effect is greater than the sum of the individual actions.

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One of the major questions that arises when plowing contractors get together is, “With all the cutthroat one-truck operators out there giving away their time, how do I get new customers?”

Maybe this is the wrong attitude. Might it be better if we (as the contractors providing services) were in a position to interview the customers we want instead of quoting work “hit or miss”? Target marketing is key to success in any business. Why should it be any different with snowplowing business?

**Cluster accounts**

If you plow a shopping plaza in one part of town, then it would be in your best interest to have additional business close to that location. Assuming that you provide tremendous service to your own customer, pay attention to the service across the street. If their lot is not plowed on time, make a note. In the spring, send a letter to the person in charge of that other site, requesting an opportunity to speak with them about their plowing. Do this as soon as the snow melts so that the problems of the past winter are still fresh in their minds. You may not get an opportunity to secure that business the first time you ask, but by staying in touch with potential customers you should be able to get the opportunity when the time comes to renew the plowing contract.

You might consider targeting all potential customers in the immediate vicinity of your satisfied customer. Ask your customer for a letter of recommendation you can use to secure new customers in the immediate area around sites you already service. If you charge “per push,” finding new customers in the immediate vicinity will cut down on travel time between jobs. If you charge “per truck” with a minimum travel time charge between customers, then lowering travel times will mean increased revenue per truck. Additionally, it is easier to incorporate new customers into the schedule if they are close to existing sites. It just makes good sense to “cluster” your accounts strategically.
Avoid taking on customers with gravel parking lots unless you can charge for the increased time. Or, you might have to include a disclaimer that allows you to charge the customer to redistribute the gravel in the lots each spring.

When a potential customer calls to get a price for plowing services, some contractors want to know why that customer is considering changing vendors. It is a fair question. If the customer is dissatisfied with his current service, this is a customer worth spending time with in order to ascertain the reasons. You might find that the previous contractor was undercharging for his services, which forced him to "shortcut" the job in order to make a profit. In these cases you may need to be frank with the customer: The bill was not enough for the service expected and you will be more expensive – but the quality of work will be better. A potential customer who wants you to provide better service at the same price is not looking for quality and dependability. He is looking for the cheapest price.

If someone calls looking to "check pricing," you may want to avoid getting involved with such tactics – unless you need practice quoting work without getting anything in return. Price shoppers will change vendors next year or, worse yet, mid season just to get a cheaper price. In this industry, customers usually discover that they got what they paid for by the second significant snowfall when the service just isn’t there.

Selling the service

When talking with potential customers, extol the virtues of dealing with your company. If you are a large contractor with a large fleet of equipment, you might point out that there is no excuse for not showing up on time (if enough snow falls soon enough to allow you to complete the plowing in the allotted timeframe). You probably have a mechanic on staff (or readily available) to get breakdowns fixed quickly, so that equipment is back up and running in short order. You may have a full-time dispatch team to ensure that “special requests” can be addressed in a timely fashion.

For small contractors, sell the fact that you don’t have a large number of customers – so every customer gets “personalized service.” You don’t have to keep track of a large contingent of trucks, so you always know where everybody is working. Personalized service means that you care about that customer’s needs, almost exclusively.

Don’t hide the fact that you make a profit. While it may seem like everyone plows snow, the fact is you are in the
minority. You provide a necessary service that requires specialized equipment, special talents and tremendous dedication to your customers. They should be glad you are ready and willing to provide services under terrible, and often unsafe, conditions. Sell these benefits of dealing with your company, no matter what size fleet you run.

And, what about your core business customers? If you provide tree care services to a property management firm – have you asked them what they do in winter to service their tenants? If not, shame on you. Repeated studies tell us that the majority of our new business comes from previous (satisfied) customers. This is your single largest source of new business. Send them a flyer announcing an ongoing extension of your business.

If you can’t afford to hire a marketing consultant to design a flyer – and most small businesses can’t – Kinko’s, PIP Printing or Copy Max can help you design and print color flyers at an affordable cost.

Most importantly, keep in mind that you are in the snow and ice management business year-round. It may not be a business your skilled tree crews look forward to in the winter, but while most of our customers only think of snow just before the season, we should be thinking about snow all year long. When soliciting new tree care business, ask about the snow business too. When you submit a tree removal proposal, ask who does the snow removal. Are they happy with the service they receive? If they say yes – tell them that they are lucky to have a good contractor. But also tell them that if they become dissatisfied, could they please give you an opportunity to secure the business?

At the same time, ask what they are charged. You should always ask, if for no other reason than to see what the competition charges. It’s no threat to the incumbent, since you know your customer is satisfied. Make sure you write the number down and file it with the property. In a couple years if you get a call to quote the work, you will have some idea “where the numbers are at” for that particular customer.

For those contractors that are in the plowing business to make a profit, it is a high profit center that merits considerable attention throughout the year. You probably don’t have a problem quoting new tree care business in January. You shouldn’t have a problem quoting snow business in June and July either.

John Al/ii is president of Snow Management Group in Erie, Pa. He is a charter member and board president of the Snow & Ice Management Association. He can be reached by e-mail at john@allinco.com.
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The Detection of Decay in Trees and Wood

By J. A. Dolwin

Machines like the IML F500 reveal the relative density distribution of wood, which allows arborists to make recommendations to clients regarding decay in the tree.

Several devices use stress waves for the inspection of cracks, cavities and rot. They work through the simultaneous measurement of the time of transmission of stress waves by sensors arranged around the trunk.

Tree owners need to know the external and internal condition of trees with accuracy and reliability. Visual inspections by an experienced arborist can provide useful knowledge about the health of trees, but this information is inevitably limited and can produce misleading results. Various devices for the detection of decay and defects are available, but they all have limitations and are generally invasive to some degree.

In some cases the use of these devices may also allow the spread of decay into unaffected areas. While invasive action is sometimes justified – for example, in cases where the alternative is to fell the tree – improved techniques that are completely non-invasive and provide quick and accurate results in a cost-effective way are required.

Improved knowledge about the health and safety of a tree obtained from the use of some devices will allow a better judgment on what action needs to be taken in the management of the tree. This information also needs to be acceptable in court. Legal case history on the use of devices to provide more accurate information about the safety of trees is, but is critical if trees are to be protected in the future.

Tree assessment

The traditional and still most common method of tree hazard evaluation is a visual assessment. This assessment will normally take into account a number of factors:
- External evidence of decay on surface roots, trunk or old wounds;
- Presence of fruiting bodies;
- External signs of mechanical stress, e.g. trunk swelling, cracks, sunken areas, etc.;
- Vigor and vitality of the tree as shown by incremental growth, twig extension and bud size, density, color and size of foliage;
- Presence and extent of deadwood and/or dieback in crown;
- Condition of bark, especially near or below ground level.

A visual inspection of trees is always the first line of approach and, when necessary, can be followed up with a more detailed internal investigation.

Other traditional methods of assessment include the mallet, portable drill, probe, and increment borer. These methods are relatively cheap and easy to use, but can be misleading, inaccurate or invasive. Various other methods have been tried in the past, including electrical resistance, electromagnetic, nuclear magnetic resonance, radar, and thermography. These latter techniques all have limitations that have restricted their wide-scale acceptance. Two other techniques currently in favor are sonic devices and micro-drills.

### Ultrasonic waves

Ultrasonic devices employ pulses of sound with frequencies above the audible range of 20,000 kHz. These devices measure the transit time of a sound wave across the trunk or branch in a radial direction. The velocity of a sound wave in a specific direction through healthy wood is more or less constant and is proportional to the square root of elasticity over density:

$$V = \sqrt{\frac{E}{\rho}}$$

where $V = \text{Velocity}$, $E = \text{Modulus of Elasticity}$ and $\rho = \text{Density}$.

The reason for the constant velocity is that although the gross density of wood can vary considerably, the density of wood matter in which all air and water is excluded is more or less constant. This velocity will vary depending on the direction of travel due to changes in the elasticity. The velocity is greatest in the axial direction followed by the radial and then the tangential directions. Where decay is present, the ratio of the elasticity to density normally changes, giving an increase in the transit time (decrease in the velocity).
The ultrasonic signal is transmitted and received by transducers placed on either side of the trunk. (See Figure 1.) Where no decay is present the measured transit time will be a straight path between the two transducers. Where decay or defects are present, the first pulse received is likely to be the signal that passes around the decay. It is this increased transit time that indicates the presence of decay or a defect.

**Figure 1. Path of measured transit time between transducers, around the shaded (decayed) area.**

The higher the frequency of the crystal in each transducer, however, the more quickly the ultrasound will be attenuated. For example, the Arborsonic Decay Detector, manufactured by Fujikura (Europe) Ltd, Westbury, UK, uses a frequency of 77 kHz and the maximum distance of recorded travel is about 1.0 to 1.4 meters. However, above these maximum distances, transit times can still be measured along the quadrants. (See Figure 2.)

**Figure 2 Disc showing two diametrical and four quadrant lines.**

Based on tabulated data from the manufacturer the anticipated (quadrant) transit time is equivalent to 40 percent of the mean diameter (mm).

Any increase in the anticipated transit time therefore indicates that the spread of decay extends into the quadrant. Where this is common on all four sides, the spread of decay exceeds 50 percent of the trunk area. This measurement could be affected, however, by the reduced speed in a tangential direction. In addition, since most trunks are asymmetrical the variation in the actual quadrant length could produce variable results. In view of these features caution is needed in the interpretation of the quadrant measurements.

**Stress waves**

Stress-wave timers (for example the “Impulshammer” made by IML) operate on a principle similar to ultrasonic timers, but utilize a mixed (low) frequency impulse produced by a hammer blow onto a wood screw inserted into the wood. The devices measure the transit time of the impulse across the specimen to a second screw on the opposite side, and provide a reading of velocity based on a known diameter. Data published thus far indicates that the stress waves travel more slowly through wood than the ultrasonic waves and also more slowly through softwoods than through hardwoods. Since the Stress Wave Timers operate at relatively low frequencies (where there is little attenuation), the use of this device is not restricted by the diameter of the trunk.

Recorded velocity is based on the measured diameter, but in areas where the transit time is affected by the presence of decay, the distance of travel is probably longer. (See Figure 1.) Therefore, this apparent velocity will probably be lower than the actual velocity. As discussed above, the velocity of sound through wood is reasonably constant but will be reduced in a tangential direction.

Ultrasonic and stress-wave devices can be used easily on trunks, branches and surface roots, but the possibility of their use below ground is inevitably limited. Both types of device are somewhat invasive, in the sense that
the former must be used on wood exposed by the removal of bark, whereas the latter operates via screws inserted a short distance into the wood.

Micro-drills

A micro-drill records the resistance encountered by a probe as it is impelled into the wood while rotating at high speed. The resistance to penetration can be accurately mapped over the cross-section being probed, provided that the drill hole follows a more or less radial path. For this reason the device has to be positioned carefully before drilling commences. In some cases, the probe is deflected from the intended path, which may produce a misleading recording.

Within a tree, the resistance of sound wood to penetration is usually greater than that of decayed wood, but it also varies within the tree, depending on factors such as changes in density or the presence of extractives, resins, reaction wood and heartwood. Even within wood of uniform resistance, there may be an apparent increase in resistance with increasing depth, caused by the friction between the probe-shaft and the displaced wood fibers that line the drill hole. This has been demonstrated by researchers using the Resistograph. It is not clear if this same pattern of resistance is evident when using the Sibert Decay Drill. The resistance of the sound wood of different species varies, of course, and there may also be substantial differences between trees of the same species.

Of the various micro-drills on the market, those described below are found to detect decay caused by different fungi within the wood of a range of tree species, but there is some evidence that this is not an invariably reliable feature of all micro-drills (Bethge et al., 1996; Schwarze et al., 1997).

Resistograph (F300)

This instrument has a wire probe 30 cm long with a 1 mm wide shaft and a flattened sharpened tip 3 mm in diameter. Other models have probe lengths up to 50 cm. The probe advances through the wood at a constant speed and the penetrability along the probe track is measured in the form of torque values. These are recorded as a tracing on a waxed sheet, which provides information on such features as early/late wood, knots, cracks, included bark, defects and decay.

Decay Detecting Drill (DDD 200)

This instrument has a wire probe with a 0.9 mm wide shaft and a flattened blunt tip 1.5 mm wide. The standard probe of this model is 20 cm long, but longer lengths can be substituted. This device measures the rate of progress through the wood, while the forward pressure is kept reasonably constant by a manual control and with the use of pressure indicator lights. The information is recorded on a pen tracing and appears as a series of lines whose distance apart increases with the penetration rate. The probe is very flexible, so that there is some risk of deflection.

Various other models of the above microdrills are now available, namely the Resistograph (E-series) and the SIBTEC DmP (Digital microProbe), which provide an electronic output. The DmP detects and measures decay in living trees. Under controlled pressure, it measures the hardness of the wood - “hardness” being the rate at which a very fine (1 mm diameter) probe drills into the wood. The more rotations of the probe, the harder the wood. Changes, resulting from decay or from annual growth patterns, show up clearly. Normally, only three or four drillings are sufficient to provide a professional arborist with enough information to save or condemn a suspect tree.

This output allows a detailed analysis of incremental patterns and may offer a method for accurately measuring incremental widths without the need for an increment borer.

Research

In view of the varying properties of wood, subsequent experiments were car-
device accurately and reliably measured changes in the velocity of a stress wave across wood samples that had been treated in the following ways:

1. Inoculated with different wood decay fungi and incubated for six and 12 weeks;
2. Moisture contents ranging from 0 percent to 120 percent.

Discussion

Sonic devices will normally provide accurate information about the presence of decay and defects, but they cannot measure the extent of the decay with the same accuracy as micro-drills. Changes in the velocity occur when the ratio of the elasticity to density changes. However, in the case of *Ustulina deusta* (Hoffm.) Lind, the fungus in the early stages of decay acts in a soft rot mode and the ratio of elasticity and density remains the same, with little evidence of any degradation of the wood.

While the stress wave devices are less sensitive than the ultrasonic devices, they have a number of potential advantages, namely:

1. Examination of the range of audible frequencies might help to accurately identify the location and extent of a defect or decay by means of a signal analysis.
2. Stress waves are not altered by the presence of water in trees in the same way as an ultrasonic wave. Hence, the diameter of the trunk is not a factor.
3. A non-invasive stress wave measurement might be possible in standing trees without damage to the bark or wood.

As a result of the experimental work completed so far using the laboratory-designed stress wave meter, further work is now needed to evaluate the changes that occur in the frequencies between healthy and decayed wood, so that the extent of decay can be measured. Since portable oscilloscopes are now available, relevant data can be obtained directly from the tree – possibly without any invasive damage. With this information it may then be possible to measure the extent of decay.

While micro-drills will normally provide useful and accurate information about the presence and extent of decay, interpretation can be difficult and misleading, and penetration of the probe may allow decay to spread into unaffected areas.

John Dolwin has spent his working life in arboriculture and forestry, mainly in southeast England. Over the last five years he has carried out his research based at the University of Reading.
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... continued on page 72
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<table>
<thead>
<tr>
<th>TCI Magazine Only</th>
<th>Website Only</th>
<th>Website Only + Photo</th>
<th>TCI Magazine &amp; Website</th>
<th>TCI, Website &amp; Photo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Members</td>
<td>$55</td>
<td>$55</td>
<td>$65</td>
<td>$65</td>
</tr>
<tr>
<td>Non-Members</td>
<td>$65</td>
<td>$65</td>
<td>$75</td>
<td>$75</td>
</tr>
</tbody>
</table>

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The Soul Advantage: The New Kind of Leadership
By John Izzo, Ph.D.

Competition in business is fierce and being known as a great place to work is more often than not also a company that expects and gives nothing but excellence! The race to attract and keep talented people, develop superior products and services, to be a great company to work for, to make profits, and to be about something beyond the bottom line are the same regardless of industry.

Today, the corporate advantage is the soul or spirit of a company. A company that is known for its inspiring leadership, its ability to nurture artistry and excellence, its commitment to employees and customers and its ability to define its higher purpose will determine its success in this millennium.

Izzo’s speaking inspires vision and a “can do” attitude. He informs with relevant facts and trends, and connects with his audience to ensure that all are involved. But most importantly, his mission is to influence and promote change.
Effective Use of Time
By Randall Stutman, Ph. D.

If artful leadership is uncommon, then admired leadership is exceedingly rare. Over the last decade, CRA, Inc., an executive development consulting firm, has pursued admired leaders in Fortune 500 companies, attempting to learn what makes them tick. Working with human resource professionals in dozens of the nation's premier organizations, they have identified and scrutinized that small handful of leaders with a reputation for achieving extraordinary results in a manner others find respectful. They have observed, interviewed, and otherwise prodded this small set of leaders, seeking answers to questions fundamental to admired leadership. During this seminar Stutman will focus on effective use of time.

Tough to Get 'Em — Tougher to Hold 'Em! Keeping Good People in a Marketplace Desperate for Good People
By David W. Richardson, CSP

You have invested serious time and money in developing a strong staff of committed personnel ... Now what can you do in today's constantly changing economy to keep them?

Learn creative, proven strategies to lead, challenge, encourage, motivate, and reward (not necessarily monetarily) valued employees who invest in a career with your organization.

OSHA’s Voluntary Comprehensive Safety and Health Management Guidelines
By Paul Cyr

Cyr will describe and explain how to implement OSHA’s Voluntary Comprehensive Safety and Health Management Guidelines in the small business environment.

Self-Evaluate Your Business’ Safety and Health Program
By Paul Cyr

Cyr will walk the audience through a real life safety and health program self-evaluation. After completing this in-depth analysis, participants will be able to self-evaluate and learn specific strategies to improve their current program.

Marketing Madness, Metamorphosis, and Motivation Non-Traditional Marketing in a Very Traditional Environment
By David W. Richardson, CSP

Is your marketing program presenting what your customer is really buying? Come prepared for a fast-paced seminar where we compare high-profile companies no longer in business with those who absolutely dominate their markets — how did they get where they are?

Learn specific strategies to help you reach your targeted customer while establishing and/or enhancing your brand in a captive marketplace.

Marketing! — Madness! — Multiplication!
By David W. Richardson, CSP

This will be a fast-paced round-table session, facilitated by Richardson in which you will share, design, and develop marketing strategies that you can immediately integrate into your business!

Arboriculture and the Law
By Randall S. Stamen

This program will involve discussions between the audience and attorney Stamen regarding lawsuits concerning trees, arborists, public entities, and property owners. Stamen will present the facts, applicable statutes and Court decisions for each illustrated case and explain how each lawsuit could have been prevented.

Early Bird registrations must be received by Jan. 11, 2002. Call the NAA at 1-800-733-2622 or view the entire program brochure online at www.natlarb.com.
TCI Article Index
A complete listing of feature articles for 2001

January
The Impact of Snow on Woody Plants
By Patrice Pelletier
Pruning Dogwoods for Health & Form
By Cass Turnbull
What’s New in Cabling, Bracing & Guying?
By Michael Roche
Historic Trees at Mount Vernon
By Joan Leotta
The Secrets of Effective Advertising
By Fran Finley
How to Interview Someone Who Has Never Held a Job
By Phillip M. Perry
Deregulation Provides a Window of Opportunity for Utility Contractors
By Richard Howland

February
Water & Trees
By Dr. Alex Shigo
The Z133 Undergoes Changes
By Peter Gerstenberger
Know the Numbers Before You Buy a Bucket Truck
By Michael Roche
Profitable Spray Operations Start With the Rig
By Paul Wolfe II
The Biltmore Estate and the Cradle of Forestry
By Joe Zetner
Managing Workplace Violence
By Phillip M. Perry

March
New Treatments: Claims, Theories & Results
By Dr. E. Thomas Smiley

April
IPM in the Real World
By Dr. John Ball
Changing Face of the Arborist Workplace
By Robert Rouse & Thomas L. Green
A Wage & Hour Law Primer
By Brian Farrington
Understanding OSHA: A look at the Agency’s Complex Environment
By Timothy G. Pepper
A Disaster Recovery Plan for Your Business
By Phillip M. Perry
Structural Soil and Urban Forestry
By David Munson
What’s New in Climbing Saws?
By Michael Roche

May
Fertilization and Tree Resistance to Insects
By Dr. Daniel A. Herms

June
Tree Chemicals That Kill or Cure
By Dr. Alex L. Shigo
Safety Aloft: Preventing Struck-by’s
By Peter Gerstenberger
Turning Wood into Cash
By Michael Roche
The Right Boot for the Right Job
By Tim Ard
Smart Moves for Tough Times
By Dick Proudfoot
Selling Tree Care
By Dick Proudfoot

Surviving the Summer Sun
By Ariana Elmakiss-Ziminsky
Operational Safety Means Training Follow-up
By Tim Ard
Transplanting With Success
By Michael Roche
Air Excavation to Improve Tree Health
By Dr. E. Thomas Smiley
What Commercial Arborists Should Know About E-Commerce
By Steve Epner
Working to Make Gray and Green Infrastructure Compatible
By Michael Galvin
Creating a Place for Workers from Other Cultures
By Ariana Elmakiss-Ziminsky
Record Keeping and Child Labor Laws
By Brian Farrington
What Arborists Should Know About Scale Insects
By David Munson
How to Create Display Ads That Sell
By Phillip M. Perry

Operational Safety Means Training
Follow-up
By Tim Ard
July

Carbon & Tree Growth
By Dr. Donald H. Marx

Preserving Trees & Soil During Construction
By David L. Schwartz

Prioritizing Rick Trees
By Brian Kane, Dr. H. Dennis P. Ryan, and Dr. David Bloniarz

Solutions to Working with Hazardous Trees
By Peter Gerstenberger

Tax Savings That Add Up for Family Businesses
By Mark E. Battersby

Direct Mail Success Secrets
By Phillip M. Perry

Guidelines for a Chipper Lockout/Tagout Program
National Arborist Association

How Do Climbers Rate Climbs?
By Tim Jackson

Precision Felling – the Natural Way
By Thomas L. Houston

August

Canker Rots and the Heart Rot Myth
By Dr. Alex L. Shigo

Opposing Pendulums – Risk Management of Hazardous Trees
By Graeme McMahon

Implementing a Drug-Free Workplace
By Brian Farrington

Charging Fees for Consulting
By Lew Bloch

Choosing a Power Pole Saw
By Rick Howland

Marketing to Different Generations
By Robert Tucker

September

New Treatments: Claims, Theories & Results
By Dr. Bruce R. Fraedrich

A Common Sense Approach to Street Tree Inventories
By Steve Sandfort

Pruning Magnolias
By Cass Turnbull

Write a Press Release the Gets Publicity
By Phillip M. Perry

Drafting Good Utility Regulations
By Richard A. Johnstone

The Art and Science of Liming Acidic Soils
By Norm Helie

California Oak Disease Spreads
By Don Dale

October

Past, Present and Future of Arborist Training
By Don Blair and Tim Walsh

What Keeps Trees Free From Insects and Diseases? Part I
By Clive G. Jones

What Will Become of Bangalore, India?
By Malini Shankar

Managing Age Waves in the Workforce
By Robert B. Tucker

Rubber Sidewalks Help Arborists Manage Tree Roots
By Don Dale

Three Steps to a Great Family Business
By Phillip M. Perry

November

Overcoming Rigging Challenges
By Don Blair

When the Chips and Down ... Some Pros Rent
By Rick Howland

What Keeps Trees Free From Insects and Diseases? Part II
By Clive G. Jones

Safe Chain Saw Users Understand Reactive Forces
By Tim Ard

December

Forecasting Dreams
By Howard Eckel

Grinders: The “Big Dogs”
By Rick Howland

California Tree Society Promotes Arborists
By Don Dale

Benefits and the Bottom Line
By Phillip M. Perry

What Keeps Trees Free From Insects and Diseases? Part III
By Clive G. Jones

Soliciting New Plowing Business
By John Allin

Detection of Decay in Trees & Wood
By J.A. Dolwin
New Battle of the Green in Lexington

The town of Lexington, Mass., recently took what supporters are calling a bold step to protect the town’s tree-lined streets by passing a bylaw that gives the town jurisdiction over trees on private property. The bylaw gives the town the right to review plans to cut all trees 8 inches or larger in diameter during construction or demolition, according to The Boston Globe.

The town believes the bylaw goes further than any other in the state. Opponents say it goes too far and infringes on property rights. Suburban Lexington, the site of some of the earliest battles of the Revolutionary War, was still waiting to hear back from the Massachusetts Attorney General on the legality of the bylaw, however.

“What we intend to do with this bylaw is have people think before they cut,” Patrick Mehr, a resident who helped draft the bylaw, told the newspaper. “It takes literally 50 minutes to cut down a 50-year-old tree.”

Another resident said the goal of the bylaw is to stop the “traumatic” cutting of trees that often accompanies new construction or, in a practice increasingly common in Lexington, the demolition of an existing house to build a larger one. The bylaw charges a fee for each tree to be cut, a mechanism supporters hope will give property owners pause before they start their chain saws.

The Quest for Power

Indianapolis Power and Light is making few friends with a new policy designed to cut down on power outages. According to an Associated Press account, IPL, as the utility is known locally, has informed customers that it has the right to cut trees on private property and will exercise it. IPL said homeowners with trees near the high-voltage power lines that supply the city should be prepared to have crews arrive to remove them. The utility says the trees have been pruned several times in recent years but continue to encroach on the power line right of way.

The utility said some trees grow as much as 18 feet in two years, forcing almost constant pruning of trees, a cost that has to be passed on to customers. “It’s a matter of reliability and safety for our customers,” company spokeswoman Crystal Livers-Powers said.

It’s Carved in the Bark

Newton, Mass., was the site of a nasty battle over some trees and a supposed promise never to cut them down. The battle pits neighbors against Lasell College, which has targeted 31 trees for removal as part of a parking-lot construction project.

According to Boston.com, neighbors say that Lasell officials promised them 35 years ago — when the college was being constructed — that the grove of 40- to 50-foot white pines would be saved as a buffer between the college and nearby homes. And today’s college administrators say they’d be more than willing to honor that pledge if someone could show them where the promise was written down.

“So far, no one has been able to show any documentation of that promise,” said a college spokesperson. The city attempted to intervene by urging the college to be considerate of neighbors’ concerns. Neighbors briefly staged pickets near the site but work went ahead after a brief delay.

Under Lock and Key

Concerned that campers and others will transport gypsy moth eggs from heavily infested forested areas into the suburbs around Chicago, state officials in Illinois are considering quarantines in some areas once they see how many of the foliage-munching caterpillars emerge in the spring.

According to the Chicago Sun-Times, Park officials say gypsy moths are laying eggs on tents, coolers and sleeping bags in some parks outside the city, items that are then being moved to suburban areas that have avoided the tree-stripping insects to date and, worse yet, to other park grounds.

The gypsy moth problem in some counties around Chicago has reached a level where the Federal government, which had been supporting spraying, is withdrawing its financing for the fight, leaving local communities to decide whether to continue to battle or wait for the infestation to run its course.
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<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ACRT, Inc. ..........</td>
<td>57</td>
<td>35. Morbark, Inc. ....</td>
<td>27</td>
</tr>
<tr>
<td>2. ADI Pruning Tools ...</td>
<td>73</td>
<td>36. NAA – Membership ...</td>
<td>53</td>
</tr>
<tr>
<td>3. Almstead Tree Company, Inc.</td>
<td>67</td>
<td>37. NAA – Model Safety Program ...</td>
<td>Inside Front Cover</td>
</tr>
<tr>
<td>Altic Industries, Inc.</td>
<td>1</td>
<td>38. NAA – Safety Videos ...</td>
<td>14-15</td>
</tr>
<tr>
<td>5. ArborLearn.org ......</td>
<td>63</td>
<td>40. Northeastern Associates</td>
<td>62</td>
</tr>
<tr>
<td>6. AmeriQuip/MTI ......</td>
<td>71</td>
<td>41. Opdyke, Inc. .......</td>
<td>35</td>
</tr>
<tr>
<td>7. Arborwear LLC ...</td>
<td>66</td>
<td>42. Payeur Distributions Inc.</td>
<td>78</td>
</tr>
<tr>
<td>8. Bailey's ............</td>
<td>23</td>
<td>43. Penn-Del Chapter, ISA</td>
<td>21</td>
</tr>
<tr>
<td>9. Bandit Industries, Inc.</td>
<td>29</td>
<td>44. Pete Mainka Enterprises, Inc.</td>
<td>75</td>
</tr>
<tr>
<td>10. The F.A. Bartlett Tree Expert Company</td>
<td>65</td>
<td>45. Rapco Industries, Inc</td>
<td>73</td>
</tr>
<tr>
<td>11. Bioscape Inc. ......</td>
<td>44</td>
<td>46. Rayco Manufacturing, Inc.</td>
<td>5</td>
</tr>
<tr>
<td>12. Bishop Company ......</td>
<td>37</td>
<td>47. Royal Truck &amp; Equipment, Inc.</td>
<td>13</td>
</tr>
<tr>
<td>15. J.P. Carlton Company, Inc.</td>
<td>Back Cover</td>
<td>50. SavATree ...</td>
<td>66</td>
</tr>
<tr>
<td>Central Boiler ..........</td>
<td>62</td>
<td>51. Schodorf Truck Body &amp; Equip. Company</td>
<td>69</td>
</tr>
<tr>
<td>16. Columbian Specialty Products</td>
<td>25</td>
<td>52. The Sharp Tool Company, Inc.</td>
<td>80</td>
</tr>
<tr>
<td>17. Concept Engineering Group, Inc. (CEG)</td>
<td>70</td>
<td>53. Sherrill Arborist Equip. &amp; Supply, Inc.</td>
<td>7</td>
</tr>
<tr>
<td>18. Creative Automation Solutions</td>
<td>44</td>
<td>54. Sherrill Arborist Equip. &amp; Supply, Inc.</td>
<td>21</td>
</tr>
<tr>
<td>19. Cutter's Choice ......</td>
<td>61</td>
<td>55. Sheyenne Tooling &amp; Manufacturing, Inc.</td>
<td>38</td>
</tr>
<tr>
<td>20. The Davey Tree Expert Company</td>
<td>68</td>
<td>56. Southco Industries, Inc.</td>
<td>33</td>
</tr>
<tr>
<td>21. DICA Marketing Co. ...</td>
<td>61</td>
<td>57. Swaploader U.S.A. Ltd.</td>
<td>30</td>
</tr>
<tr>
<td>22. Environmental Industries, Inc.</td>
<td>64</td>
<td>58. Swinger Loaders Div. NMC-Wollard, Inc.</td>
<td>11</td>
</tr>
<tr>
<td>23. Fanno Saw Works ....</td>
<td>68</td>
<td>59. Tamarack Clearing ....</td>
<td>59</td>
</tr>
<tr>
<td>24. Forestry Equipment of Shelby, Inc.</td>
<td>55</td>
<td>60. Terex Telelect, Inc</td>
<td>3</td>
</tr>
<tr>
<td>25. Future Forestry Products, Inc.</td>
<td>50</td>
<td>61. Tilton Equipment Co. DeptRPM/Jonsred</td>
<td>40</td>
</tr>
<tr>
<td>27. Good Tree Care Company</td>
<td>60</td>
<td>63. Trucks &amp; Parts of Tampa</td>
<td>17</td>
</tr>
<tr>
<td>Hendricksen the Care of Trees, Inc.</td>
<td>69</td>
<td>64. Trueco, Inc.</td>
<td>11</td>
</tr>
<tr>
<td>28. IML - Instrument Mechanic Labor, Inc.</td>
<td>60</td>
<td>65. V &amp; H Inc.</td>
<td>39</td>
</tr>
<tr>
<td>29. ImpleMax Equipment Co.</td>
<td>28</td>
<td>66. Versalift, Time Manufacturing Co.</td>
<td>51</td>
</tr>
<tr>
<td>30. Independent Protection Company</td>
<td>67</td>
<td>67. Western Tree Equipment &amp; Repairs</td>
<td>43</td>
</tr>
<tr>
<td>31. Lewis Utility Truck Sales, Inc.</td>
<td>72</td>
<td>68. Winter Management Conference 2002 Ins Back Cover</td>
<td></td>
</tr>
<tr>
<td>32. J. J. Maugel ..........</td>
<td>45</td>
<td>69. Wood-Mizer Products, Inc</td>
<td>72</td>
</tr>
<tr>
<td>33. Mickey's Truck &amp; Equipment Sales Inc.</td>
<td>47</td>
<td>70. Zenith Cutter Company</td>
<td>34</td>
</tr>
</tbody>
</table>

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Over the past few years I have adapted a technique that I have not seen described or used by others. I call it collapsing and have found it to be useful in several situations.

The premise of the technique is to reduce the height or length of a limb to allow it to be lowered or dropped more easily. If you put in mind a folding ladder or a collapsing walking stick, this would be the concept in a nutshell.

The situation that brought this idea about was one we all encounter from time to time. I was to remove a scarlet oak that was 75 to 80 feet tall with a crown spread of 50 to 60 feet. This tree was adjacent to a white oak of similar size. The dominant lead of the scarlet oak overhung an understory red maple that was to be a very important part of the landscape.

The tree had several co-dominant stems. One stem led to an open spot where lowered limbs could be landed easily. This stem was not a dominant lead but was still the best lowering point in the tree. All the lower sections that needed to be roped were swung away and lowered away from the landscape below.

I reached a point where the two stems that were left didn't match up real well. The dominant lead was overhanging the understory red maple, approximately 20 feet above and 20 feet away from the lowering point on the lesser stem. This dominant lead could not be free dropped nor butt hitched without causing damage to the remaining landscape. With this in mind I needed to reduce this lead to a height slightly below the lowering point on the lesser stem. A friend of mine, Bob Weber, showed me the concept of taking multiple limbs at one time some years before. This was usually done on limbs that are on the same horizontal level (i.e. a whirl of limbs on an evergreen). This situation was a vertical stem, so it required a different system.

This dominant lead had five vertical limbs of approximately 3-inch caliper that were 15 to 20 feet in length above the lowering point. I picked a spot on this lead slightly below the lowering point on the lesser stem. Here I started by taking an excessive amount of lowering line and put a girth hitch at this point. With the excess tail I continued tying girth hitches at each branch intersection until I got to the last set of co-dominant limbs. Here I tied a clove hitch with two half hitches.

Next, I reversed my direction, cutting loose each secured piece. They tipped over and caught at the girth hitch below. I got to the initial girth hitch and dropped several feet below it to allow this section to be butt heavy. I made my final cut in the direction of the lowering point and eased the pieces to the lowering point. A 30-foot lead had been collapsed to a series of pieces approximately 20 feet in length. As a result, no damage was to the existing landscape. One note to all who try this technique: Always tie any knots that will bear weight on each side of the knot with a girth hitch. (We were only able to get it undone by severing the rope at the knot.)

I have since used this technique with good success in many landscape and architectural situations, minimizing the risk of damage. When the occasion presents itself give this a try. It's one more technique to add to your bag tricks that help make you the professional you are.

Kris Edson is the lead tree surgeon for The Pennsylvania State University.
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## Index of Advertisers

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>144.</td>
<td></td>
<td>126.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>163.</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>148.</td>
<td></td>
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<td></td>
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TCI BUYERS' GUIDE - DECEMBER 2001 - 25
Subject Listing

Distributors
Manufacturers
Industry Support and Services Providers

Distributors

Adjuvants/Miscellaneous Chemicals
American Arborist Supplies Inc.
ESSCO Distributors Inc.
Forrest Lyle & Sons, Inc.
Ben Meadows Company
Midwest Arborist Supplies
Professional Tree Surgeon Supplies, Inc.
Sherrill Arborist Supply

Bioinsecticides
American Arborist Supplies Inc.
ESSCO Distributors Inc.
Forrest Lyle & Sons, Inc.
Midwest Arborist Supplies
Professional Tree Surgeon Supplies, Inc.
Sherrill Arborist Supply

Biopesticides
ESSCO Distributors Inc.
Forrest Lyle & Sons, Inc.
Professional Tree Surgeon Supplies, Inc.
Sherrill Arborist Supply

Aerial Lifts
Aerial Lift, Inc.
CUES, Inc.
G & A Equipment, Inc.
MAT-3, Inc.
Mickey's Truck & Equipment Sales Inc.
MIRK, Inc./Toombs Truck & Equip. Co.
NESSCO, Inc.
Opdyke, Inc.
Sherrill Arborist Supply
Southeastern Equipment Company
Specialized Hydraulics, Inc.
Thayer Chevrolet Toyota
Trueco, Inc.

Aerial Lifts - Parts & Equipment
Aerial Equipment, LLC
Aerial Lift, Inc.
CUES, Inc.
MAT-3, Inc.
Mickey’s Truck & Equipment Sales Inc.
NESSCO, Inc.
Sherrill Arborist Supply
Specialized Hydraulics, Inc.
Trueco, Inc.

Augers - Earth & Bits
American Arborist Supplies Inc.
Bailey's
CUES, Inc.
Deer Creek Equipment
ESSCO Distributors Inc.
Forestry Suppliers, Inc.
J. P. Fuller Inc.
Karl Kuemmerling, Inc.
Labonville Inc.
Lanphear Supply
Midwest Arborist Supplies
Pacific Arborist Supplies, Ltd.
Professional Tree Surgeon Supplies, Inc.
Stuart Brown Chainsaw Specialists
Tree Tools

Blowers, Debris
American Arborist Supplies Inc.
Arborist Supply Co., Inc.
Bishop Company
Blue Ridge Arborist Supply
Cleaves Company, Inc.
Deer Creek Equipment
ESSCO Distributors Inc.
J. P. Fuller Inc.
Lanphear Supply
Ben Meadows Company
Outdoor Equipment Distributors Inc.
Pacific Arborist Supplies, Ltd.
Stuart Brown Chainsaw Specialists
Tree Tools
Western Tree Equipment & Repairs

Cabling & Bracing
Alexander Equipment Co. Inc.
American Arborist Supplies Inc.
American Chainsaws & 2 Cycle, Inc.
Bailey’s
Bartlett Manufacturing Company
Bishop Company

Chain Saws & Accessories
Aerial Equipment, LLC
Alexander Equipment Co. Inc.
Alliance Equipment Company, Inc.
American Arborist Supplies Inc.
American Chainsaws & 2 Cycle, Inc.
Arbor Direct, LLC
Arborist Supply Co., Inc.
Bailey’s
Bishop Company
Blue Ridge Arborist Supply
Cleaves Company, Inc.
Deer Creek Equipment
ESSCO Distributors Inc.
J. P. Fuller Inc.
Growthtech, Inc.
Hollie Wood Enterprises
Karl Kuemmerling, Inc.
Labonville Inc.
Lanphear Supply
NESSCO, Inc.
**Distributors (cont.) ...**

**Chain Saws & Accessories (cont.)**
- Niemeyer Corporation
- Northeastern Arborist Supply
- Outdoor Equipment Distributors Inc.
- Professional Tree Surgeon Supplies, Inc.
- Reliable Equipment & Service Co Inc.
- Shelter Tree, Inc./Tree Care Products
- Sherrill Arborist Supply
- Stuart Brown Chainsaw Specialists
- Tilton Equipment Co c/o Jonaser/EFCO
- Tree Tools
- Western Tree Equipment & Repairs

**Chemical Absorbants**
- American Arborist Supplies Inc.
- ESSCO Distributors Inc.
- Forrest Lytle & Sons, Inc.
- Professional Tree Surgeon Supplies, Inc.

**Chippers**
- Aerial Equipment, LLC
- Alexander Equipment Co. Inc.
- Arbor Supply Co., Inc.
- Arborlink
- Blade Equipment Inc.
- Blue Ridge Arborist Supply
- The Cat Rental Store
- Cleaves Company, Inc.
- Crane & Shovel Sales Corp.
- Deer Creek Equipment
- Droege Equipment Inc.
- ESSCO Distributors Inc.
- G & A Equipment, Inc.
- Karl Kuemmerling, Inc.
- Lanphear Supply
- Mickey's Truck & Equipment Sales Inc.
- NESCO, Inc.
- Northeastern Arborist Supply
- Opdyke, Inc.
- Pacific Arborist Supplies, Ltd.
- Professional Tree Surgeon Supplies, Inc.
- Shelter Tree, Inc./Tree Care Products
- Southeastern Equipment Company
- Stuart Brown Chainsaw Specialists
- Tree Tools
- Trueco, Inc.
- WesSpur, LLC
- Western Tree Equipment & Repairs

**Climbing Gear**
- Aerial Equipment, LLC
- Alexander Equipment Co. Inc.
- American Arborist Supplies Inc.
- American Chainsaws & 2 Cycle, Inc.
- Arbor Direct, LLC
- Arborist Supply Co., Inc.
- Arborlink
- Bailey’s
- Bartlett Manufacturing Company
- Bashlin Industries, Inc.
- Bishop Company
- Blue Ridge Arborist Supply
- Buckingham Manufacturing Co., Inc.
- Cleaves Company, Inc.
- Climb Axe, Ltd.
- Cutter’s Choice
- Deer Creek Equipment
- Droege Equipment Inc.
- ESSCO Distributors Inc.
- Forestry Suppliers, Inc.
- Forrest Lytle & Sons, Inc.
- J. P. Fuller Inc.
- Growtech, Inc.
- Hollies Wood Enterprises
- Karl Kuemmerling, Inc.
- Kramer Equipment Co., Inc.
- Labonville Inc.
- Lanphear Supply
- Ben Meadows Company
- Midwest Arborist Supplies
- Northeastern Arborist Supply
- Pacific Arborist Supplies, Ltd.
- Petzl America
- Professional Tree & Turf Equipment
- Professional Tree Surgeon Supplies, Inc.
- Reliable Equipment & Service Co Inc.
- Shelter Tree, Inc./Tree Care Products
- Sherrill Arborist Supply
- Stuart Brown Chainsaw Specialists
- Tree Tools
- WesSpur, LLC
- Western Tree Equipment & Repairs

**Clothing**
- American Chainsaws & 2 Cycle, Inc.
- Bailey’s
- Bartlett Manufacturing Company
- Bishop Company
- Blue Ridge Arborist Supply
- Cleaves Company, Inc.
- Commercial Cutters Direct
- Deer Creek Equipment
- Forrest Lytle & Sons, Inc.
- Growtech, Inc.
- Karl Kuemmerling, Inc.
- Labonville Inc.
- Ben Meadows Company
- Midwest Arborist Supplies
- Pacific Arborist Supplies, Ltd.
- Sherrill Arborist Supply
- Stuart Brown Chainsaw Specialists

**Communication Systems**
- American Arborist Supplies Inc.
- Arbor Computer Systems
- Northwest Arborist Supply
- Tree Tools

**Composting Equipment**
- Cleaves Company, Inc.

**Computer Hardware/Software**
- Arbor Computer Systems
- Creative Automation Solutions/
- Tree Management Systems, Inc.

**Cranes**
- Crane & Shovel Sales Corp.
- NESCO, Inc.
- Royal Truck & Equipment, Inc.
- Southeastern Equipment Company

**Diagnostic Tools**
- Alatec Scientific Inc.
- American Arborist Supplies Inc.
- Bishop Company
- Concept Engineering Group, Inc.(CEG)
- IML - Instrument Mechanical Labor, Inc.
- Sibtec Microprobes
- Tree Tools
- WesSpur, LLC

**Education/Workshop/Reference**
- American Arborist Supplies Inc.
- Arborist Supply Co., Inc.
- Lanphear Supply
- Niemeyer Corporation
- Rainbow Treecare Scientific

**Engines & Engine Parts**
- Aerial Equipment, LLC
- American Arborist Supplies Inc.
- Auto Manufacturing, Inc.
- Capital Engine Co.
- Cleaves Company, Inc.
- Commercial Cutters Direct
- Cummins Michigan, Inc.
- Deer Creek Equipment
- Engine Center
- ESSCO Distributors Inc.
- McDonald Equipment Company
- Pacific Arborist Supplies, Ltd.
- Perkins Power Corporation
Distributors (cont.) ...

**Engines & Engine Parts (cont.)**
- Power Great Lakes, Inc.
- Professional Tree & Turf Equipment
- Sherrill Arborist Supply
- Southeastern Equipment Company
- Superior Diesel Inc.
- Tree Tools

**Excavators**
- Cleaves Company, Inc.
- Deer Creek Equipment
- Rayco Manufacturing, Inc.

**Fertilization/Aeration Equipment**
- American Arborist Supplies Inc.
- Cleaves Company, Inc.
- Concept Engineering Group, Inc. (CEG)
- Deer Creek Equipment
- Forrest Lytle & Sons, Inc.
- J. P. Fuller Inc.
- Lanphear Supply
- Ben Meadows Company
- Midwest Arborist Supplies
- Northeast Arborist Supply
- Professional Tree & Turf Equipment
- Professional Tree Surgeon Supplies, Inc.
- Shelter Tree, Inc./Tree Care Products
- Sherrill Arborist Supply

**Fertilization Supplies**
- American Arborist Supplies Inc.
- Bishop Company
- Cleaves Company, Inc.
- Deer Creek Equipment
- Forrest Lytle & Sons, Inc.
- Lanphear Supply
- Ben Meadows Company
- Midwest Arborist Supplies
- Northeast Arborist Supply
- Professional Tree & Turf Equipment
- Professional Tree Surgeon Supplies, Inc.
- ROOTWELL Inc.
- Sherrill Arborist Supply

**Footwear**
- Bailey's
- Bishop Company
- Blue Ridge Arborist Supply
- Commercial Cutters Direct
- Forestry Suppliers, Inc.
- Growtech, Inc.
- Karl Kuemmerling, Inc.
- Labonville Inc.
- Sherrill Arborist Supply
- Tilton Equipment Co c/o Jonsered/EFCO

**Fungicides**
- American Arborist Supplies Inc.
- ESSCO Distributors Inc.
- Forrest Lytle & Sons, Inc.

**General Arborist Supplies**
- Aerial Equipment, LLC
- Ahlborn Equipment, Inc.
- Alexander Equipment Co. Inc.
- American Arborist Supplies Inc.
- American Chainsaws & 2 Cycle, Inc.
- Arbor Direct, LLC
- Arborist Supply Co., Inc.
- Arborlink
- Bailey's
- Bishop Company
- Blue Ridge Arborist Supply
- Cleaves Company, Inc.
- Commercial Cutters Direct
- Cutter's Choice
- Deer Creek Equipment
- Droge Equipment Inc.
- ESSCO Distributors Inc.
- Fehr Bros. Industries, Inc.
- Forestry Suppliers, Inc.
- Forrest Lytle & Sons, Inc.
- Growtech, Inc.
- Hollie Wood Enterprises
- Honey Brothers, Ltd.
- Karl Kuemmerling, Inc.
- Kramer Equipment Co., Inc.
- Labonville Inc.
- Lanphear Supply
- Ben Meadows Company
- Midwest Arborist Supplies
- Niemeyer Corporation
- Pacific Arborist Supplies, Ltd.
- Professional Tree & Turf Equipment
- Professional Tree Surgeon Supplies, Inc.
- ROOTWELL Inc.
- Shelter Tree, Inc./Tree Care Products
- Sherrill Arborist Supply
- Sierra Moreno Mercantile
- Stuart Brown Chainsaw Specialists
- Tree Care Supplies, Ltd.
- Tree Tools
- WesSpur, LLC
- Western Tree Equipment & Repairs

**Grapples/Loaders**
- Blade Equipment Inc.
- Brownwood Sales
- Crane & Shovel Sales Corp.
- Deer Creek Equipment
- Growtech, Inc.
- Payeur Distributions Inc.
- Royal Truck & Equipment, Inc.
- Southeastern Equipment Company

**Growth Retardants/Regulators**
- American Arborist Supplies Inc.
- Forrest Lytle & Sons, Inc.
- Sherrill Arborist Supply

**Herbicides**
- American Arborist Supplies Inc.
- Forestry Suppliers, Inc.
- Forrest Lytle & Sons, Inc.
- Ben Meadows Company

**Hydraulic Tools & Equipment**
- Aerial Lift, Inc.
- American Arborist Supplies Inc.
- Bishop Company
- CUES, Inc.
- Deer Creek Equipment
- Karl Kuemmerling, Inc.
- Midwest Arborist Supplies
- NESCO, Inc.
- Professional Tree Surgeon Supplies, Inc.
- Reliable Equipment & Service Co Inc.
- Southeastern Equipment Company
- WesSpur, LLC
- Western Tree Equipment & Repairs

**Insecticides**
- American Arborist Supplies Inc.
- Bayer Corporation, Ag. Division
- ESSCO Distributors Inc.
- Forrest Lytle & Sons, Inc.
- Midwest Arborist Supplies
- Professional Tree Surgeon Supplies, Inc.
- Sherrill Arborist Supply

**Integrated Pest Management**
- American Arborist Supplies Inc.
- Arbor Computer Systems
- ESSCO Distributors Inc.
- Professional Tree Surgeon Supplies, Inc.
- Rainbow Treecare Scientific

**Irrigation/Aeration Products**
- Deer Creek Equipment
- ROOTWELL Inc.
- Sherrill Arborist Supply

**Generators**
- Capital Engine Co.
- Cleaves Company, Inc.
- CUES, Inc.
- Deer Creek Equipment
- J. P. Fuller Inc.
- McDonald Equipment Company
- Ben Meadows Company
- Northeast Arborist Supply
- Pacific Arborist Supplies, Ltd.
- Tree Tools
Distributors (cont.) ...

Knives, Chipper
Aerial Equipment, LLC
Alexander Equipment Co. Inc.
American Arborist Supplies Inc.
Arborlink
Blue Ridge Arborist Supply
Cleaves Company, Inc.
Crane & Shovel Sales Corp.
CUES, Inc.
Droege Equipment Inc.
ESSCO Distributors Inc.
Growtech, Inc.
Hollie Wood Enterprises
Karl Kuemmerling, Inc.
Lanphear Supply
Midwest Arborist Supplies
Northeastern Arborist Supply
Opdyke, Inc.
Pacific Arborist Supplies, Ltd.
Professional Tree Surgeon Supplies, Inc.
Shelter Tree, Inc./Tree Care Products
Sherrill Arborist Supply
Southeastern Equipment Company
Tree Tools
WesSpur, LLC
Western Tree Equipment & Repairs

Knives, Chipper Repair
Aerial Equipment, LLC
Alexander Equipment Co. Inc.
American Arborist Supplies Inc.
Blue Ridge Arborist Supply
Cleaves Company, Inc.
CUES, Inc.
Droege Equipment Inc.
ESSCO Distributors Inc.
Karl Kuemmerling, Inc.
Northeastern Arborist Supply
Pacific Arborist Supplies, Ltd.
Professional Tree Surgeon Supplies, Inc.
Shelter Tree, Inc./Tree Care Products
Sherrill Arborist Supply
Tree Tools
WesSpur, LLC

Ladders
Aerial Equipment, LLC
American Arborist Supplies Inc.
Bishop Company
Cleaves Company, Inc.
Karl Kuemmerling, Inc.
Kramer Equipment Co., Inc.
Pacific Arborist Supplies, Ltd.
Shelter Tree, Inc./Tree Care Products
Sherrill Arborist Supply
Tree Tools

Lawn Maintenance Equipment
American Chainsaws & 2 Cycle, Inc.
Ben Meadows Company
Commercial Cutters Direct
Concept Engineering Group, Inc.(CEG)
Deer Creek Equipment
ESSCO Distributors Inc.
J. P. Fuller Inc.
Karl Kuemmerling, Inc.
Ben Meadows Company
Niemeyer Corporation
Outdoor Equipment Distributors Inc.
Pacific Arborist Supplies, Ltd.
Stuart Brown Chainsaw Specialists
Tree Tools
WesSpur, LLC

Lightning Protection Systems
American Arborist Supplies Inc.
CUES, Inc.
Independent Protection Company
Northeastern Arborist Supply
Tree Tools

Lubricants
Arbor Direct, LLC
Deer Creek Equipment
ESSCO Distributors Inc.
Fehr Bros. Industries, Inc.
Growtech, Inc.
Pacific Arborist Supplies, Ltd.
Stuart Brown Chainsaw Specialists
Tree Tools

Macro Infusion Supplies
American Arborist Supplies Inc.
Rainbow Treecare Scientific

Miticides
American Arborist Supplies Inc.
Forrest Lytle & Sons, Inc.
Professional Tree Surgeon Supplies, Inc.

Mulch Coloring Equipment
Alexander Equipment Co. Inc.
American Arborist Supplies Inc.
Southeastern Equipment Company

Natural Homeopathic Remedies
American Arborist Supplies Inc.
SelfHEAL, Inc.
Sherrill Arborist Supply

Office Supplies
Alatec Scientific Inc.
Arbor Computer Systems

Pneumatic Tools
American Arborist Supplies Inc.
Karl Kuemmerling, Inc.
Sherrill Arborist Supply

Poison Ivy Protection
American Arborist Supplies Inc.
Bailey's
Bishop Company
Cleaves Company, Inc.
ESSCO Distributors Inc.
Forestry Suppliers, Inc.
Growtech, Inc.
Ben Meadows Company
Midwest Arborist Supplies
Professional Tree Surgeon Supplies, Inc.
SelfHEAL, Inc.
Sherrill Arborist Supply
Tree Tools

Power Pruning Equipment
American Arborist Supplies Inc.
Bailey's
Bishop Company
Blue Ridge Arborist Supply
Cleaves Company, Inc.
Deer Creek Equipment
ESSCO Distributors Inc.
Florian Ratchet-Cut
J. P. Fuller Inc.
Growtech, Inc.
Karl Kuemmerling, Inc.
Lanphear Supply
Lawn Equipment Parts Co.
NESCO, Inc.
Niemeyer Corporation
Northeastern Arborist Supply
Outdoor Equipment Distributors Inc.
Pacific Arborist Supplies, Ltd.
Professional Tree & Turf Equipment
Professional Tree Surgeon Supplies, Inc.
Shelter Tree, Inc./Tree Care Products
Sherrill Arborist Supply
Southeastern Equipment Company
Stuart Brown Chainsaw Specialists
Tree Tools
WesSpur, LLC
Western Tree Equipment & Repairs

Protective Equipment
American Arborist Supplies Inc.
American Chainsaws & 2 Cycle, Inc.
Arbor Direct, LLC
Arborist Supply Co., Inc.
Arborlink
Bailey's
Bishop Company
Cleaves Company, Inc.
Climb Axe, Ltd.
Commercial Cutters Direct
Cutter's Choice
Deer Creek Equipment
ESSCO Distributors Inc.
Forestry Suppliers, Inc.
Distributors (cont.) ...

Protective Equipment (cont.)
Forrest Lytle & Sons, Inc.
Growtech, Inc.
Karl Kuemmerling, Inc.
Kramer Equipment Co., Inc.
Labonville Inc.
Ben Meadows Company
Midwest Arborist Supplies
Niemeyer Corporation
Pacific Arborist Supplies, Ltd.
Petzl America
Professional Tree Surgeon Supplies, Inc.
Shelter Tree, Inc./Tree Care Products
Starr Brown Chainsaw Specialists
Tilton Equipment Co
Jonsered/EFCO
Tree Tools
WesSpur, LLC
Western Tree Equipment & Repairs

Pruning Supplies
Aerial Equipment, LLC
Alexander Equipment Co. Inc.
American Arborist Supplies Inc.
American Chainsaws & 2 Cycle, Inc.
Arbor Direct, LLC
Arborist Supply Co., Inc.
Bailey’s
Bishop Company
Blue Ridge Arborist Supply
Commercial Cutters Direct
Cutter’s Choice
Deer Creek Equipment
Droege Equipment Inc.
ESSCO Distributors Inc.
Florian Ratchet-Cut
Forestry Suppliers, Inc.
Forrest Lytle & Sons, Inc.
Growtech, Inc.
Karl Kuemmerling, Inc.
Kramer Equipment Co., Inc.
Labonville Inc.
Lanphear Supply
Midwest Arborist Supplies
Niemeyer Corporation
Northeast Arborist Supply
Pacific Arborist Supplies, Ltd.
Petzl America
Pigeon Mountain Industries
Professional Tree & Turf Equipment
Professional Tree Surgeon Supplies, Inc.
Shelter Tree, Inc./Tree Care Products
Sherrill Arborist Supply
Stuart Brown Chainsaw Specialists
Tree Tools
WesSpur, LLC
Western Tree Equipment & Repairs

Repellents
American Arborist Supplies Inc.
ESSCO Distributors Inc.
Forestry Suppliers, Inc.
Forrest Lytle & Sons, Inc.
Ben Meadows Company
Sherrill Arborist Supply

Right-of-Way/ Land Clearing Equipment
Brownwood Sales
Cleaves Company, Inc.
Deer Creek Equipment
Payeur Distributions Inc.
Rayco Manufacturing, Inc.
Southeastern Equipment Company

Root Barriers
American Arborist Supplies Inc.
Ben Meadows Company
Bishop Company
Pacific Arborist Supplies, Ltd.
Shelter Tree, Inc./Tree Care Products
Sherrill Arborist Supply
Tree Tools
Western Tree Equipment & Repairs

Root Cutters
Pacific Arborist Supplies, Ltd.
Tree Tools
Western Tree Equipment & Repairs

Rope
Aerial Equipment, LLC
Alexander Equipment Co. Inc.
American Arborist Supplies Inc.
American Chainsaws & 2 Cycle, Inc.
Arbor Direct, LLC
Arborist Supply Co., Inc.
Bailey’s
Ben Meadows Company
Bishop Company
Blue Ridge Arborist Supply
Cleaves Company, Inc.
Climb Axe, Ltd.
Commercial Cutters Direct
Cutter’s Choice
Deer Creek Equipment
Droege Equipment Inc.
ESSCO Distributors Inc.
Forestry Suppliers, Inc.
Forrest Lytle & Sons, Inc.
J. P. Fuller Inc.
Growtech, Inc.
Hollie Wood Enterprises
Karl Kuemmerling, Inc.
Northeast Arborist Supply
Southeastern Equipment Company
WesSpur, LLC

Root Cutters
American Arborist Supplies Inc.
Ben Meadows Company
Bishop Company
Pacific Arborist Supplies, Ltd.
Shelter Tree, Inc./Tree Care Products
Sherrill Arborist Supply
Tree Tools
Western Tree Equipment & Repairs

Skidsteer Loaders & Implements
Blade Equipment Inc.
The Cat Rental Store
Cleaves Company, Inc.
Deer Creek Equipment

Snow Removal Equipment
Cleaves Company, Inc.
Commercial Cutters Direct
Deer Creek Equipment
J. P. Fuller Inc.
Niemeyer Corporation
Pacific Arborist Supplies, Ltd.

Soil Amendments
American Arborist Supplies Inc.
Ben Meadows Company
Cleaves Company, Inc.
Midwest Arborist Supplies
Northeast Shade Tree

TCI BUYERS’ GUIDE - DECEMBER 2001 - 30
Distributors (cont.) ...

Soil Amendments (cont.)
Professional Tree Surgeon Supplies, Inc.
Shelter Tree, Inc./Tree Care Products

Sprayers & Accessories
American Arborist Supplies Inc.
Ben Meadows Company
Deer Creek Equipment
ESSCO Distributors Inc.
Forestry Suppliers, Inc.
J. P. Fuller Inc.
Karl Kueblerming, Inc.
Lanphear Supply
Minnesota Wanner Company
Northeastern Arborist Supply
Outdoor Equipment Distributors Inc.
Pacific Arborist Supplies, Ltd.
Professional Tree & Turf Equipment
Professional Tree Surgeon Supplies, Inc.
Shelter Tree, Inc./Tree Care Products
Sherrill Arborist Supply
Stump Cutters
Aerial Equipment, LLC
Alexander Equipment Co. Inc.
Arborist Supply Co., Inc.
Blade Equipment Inc.
Blue Ridge Arborist Supply
Cleaves Company, Inc.
Crane & Shovel Sales Corp.
Deer Creek Equipment
Droege Equipment Inc.
ESSCO Distributors Inc.
Growtech, Inc.
Midwest Arborist Supplies
Niemeier Corporation
Northeastern Arborist Supply
Pacific Arborist Supplies, Ltd.
Professional Tree Surgeon Supplies, Inc.
Rayco Manufacturing, Inc.
Shelter Tree, Inc./Tree Care Products
Sherrill Arborist Supply
Southeastern Equipment Company
Specialized Hydraulics, Inc.
Tree Tools
WesSpur, LLC
Western Tree Equipment & Repairs
Sweepers
Cleaves Company, Inc.
Deer Creek Equipment
J. P. Fuller Inc.
Pacific Arborist Supplies, Ltd.
Traffic Safety
American Arborist Supplies Inc.
Ben Meadows Company
Bishop Company
Cleaves Company, Inc.
Deer Creek Equipment
ESSCO Distributors Inc.
Forestry Suppliers, Inc.
Karl Kueblerming, Inc.
Kramer Equipment Co., Inc.
Midwest Arborist Supplies
Northeastern Arborist Supply
Pacific Arborist Supplies, Ltd.
Professional Tree Surgeon Supplies, Inc.
Shelter Tree, Inc./Tree Care Products
Stuart Brown Chainsaw Specialists
Tree Protectors
American Chainsaws & 2 Cycle, Inc.
Bailey's
Ben Meadows Company
Cleaves Company, Inc.
Deer Creek Equipment
Forestry Suppliers, Inc.
Growtech, Inc.
Midwest Arborist Supplies
Pacific Arborist Supplies, Ltd.
Sherrill Arborist Supply
Tree Spade
Ben Meadows Company
Deer Creek Equipment
Pacific Arborist Supplies, Ltd.
Stuart Brown Chainsaw Specialists
Trenchers
Ben Meadows Company
Concept Engineering Group, Inc.(CEG)
Deer Creek Equipment
NESCO, Inc.
Outdoor Equipment Distributors Inc.
Pacific Arborist Supplies, Ltd.
Trucks & Truck Accessories
Aerial Equipment, LLC
Aerial Lift, Inc.
American Arborist Supplies Inc.
CUES, Inc.
DICA Marketing Co.
G & A Equipment, Inc.
Hino Diesel Trucks (U.S.A.) Inc.
Mickey's Truck & Equipment Sales Inc.
Opdyke, Inc.
Payeur Distributions Inc.
Royal Truck & Equipment, Inc.
Southeastern Equipment Company
Thayer Chevrolet Toyota
Tub Grinders
Alexander Equipment Co. Inc.
Opdyke, Inc.
Southeastern Equipment Company

Stump Cutters
Blue Ridge Arborist Supply
Deer Creek Equipment
Droege Equipment Inc.
Karl Kueblerming, Inc.
Professional Tree Surgeon Supplies, Inc.

Stump Cutters - Teeth
Aerial Equipment, LLC
Alexander Equipment Co. Inc.
American Arborist Supplies Inc.
Arborist Supply Co., Inc.
Blue Ridge Arborist Supply

Tree Injection/Implant
American Arborist Supplies Inc.
American Chainsaws & 2 Cycle, Inc.
Ben Meadows Company
Cleaves Company, Inc.
Droege Equipment Inc.
ESSCO Distributors Inc.
Forestry Suppliers, Inc.
Forrest Lytle & Sons, Inc.
Lanphear Supply
Midwest Arborist Supplies
Northeastern Arborist Supply
Professional Tree Surgeon Supplies, Inc.
Rainbow Tree Care Scientific
Shelter Tree, Inc./Tree Care Products
Sherrill Arborist Supply

STUMP CUTTERS PTO
Blue Ridge Arborist Supply
Deer Creek Equipment
Droege Equipment Inc.
Karl Kueblerming, Inc.
Professional Tree Surgeon Supplies, Inc.

STUMP CUTTERS
Aerial Equipment, LLC
Alexander Equipment Co. Inc.
American Arborist Supplies Inc.
Arborist Supply Co., Inc.
Blue Ridge Arborist Supply

TCI BUYERS' GUIDE - DECEMBER 2001 - 31
**Distributors (cont.) ...**

**Manufacturers ...**

**Used Equipment**
- Baker Equipment
- Buckingham Manufacturing Co., Inc.
- DICA Marketing Co.
- Jameson
- MTI Insulated Products Inc.
- Plastic Composites Corporation

**Augers - Earth & Bits**
- Border City Tool & Manufacturing Co.
- Grow Gun Corporation
- Karl Kuemmerling, Inc.
- Power Planter, Inc.
- Redmax-Komatsu Zenoah America Inc.

**Bioinsecticides**
- Monterey Lawn & Garden Products
- Plant Health Care, Inc.

**Biopesticides**
- Envirometrics Inc.
- GreenPro Services
- Monterey Lawn & Garden Products

**Blowers, Debris**
- Redmax-Komatsu Zenoah America Inc.
- Tanaka Power Equipment

**Cabling & Bracing**
- Preformed Line Products
- Vermeer Manufacturing Company
- Wall Industries

**Chain Saws & Accessories**
- Buckingham Manufacturing Co., Inc.
- Husqvarna
- Jameson
- Oregon Cutting Systems
- Plastic Composites Corporation
- Rapco Industries, Inc.
- Redmax-Komatsu Zenoah America Inc.
- Reliable Equipment & Service Co Inc.
- Sabre Saw Chain/John Deere
- Consumer Products
- Shindaiwa, Inc.
- Stihl Incorporated
- Tanaka Power Equipment
- Tilton Equipment Co c/o Jonsered/EFCO

**Chemical Absorbants**
- Remke Enterprises, Inc.

**Chippers**
- Bandit Industries, Inc.
- J. P. Carlton Company, Div. DAF Inc.
- Doskocil Industries, Inc.
- Dynamic Manufacturing Corp.
- Karl Kuemmerling, Inc.

**Utility Carts**
- The Cat Rental Store
- CUES, Inc.
- Kramer Equipment Co., Inc.
- Rayco Manufacturing, Inc.
- Sherrill Arborist Supply

**Manufacturers**

**Adjuvants/Miscellaneous Chemical**
- Monterey Lawn & Garden Products
- Nu-Arbor Tree & Shrub Care Products
- Plant Health Care, Inc.
- Remke Enterprises, Inc.

**Aerial Lifts**
- Aerial Lift, Inc.
- Altec Industries, Inc.
- American Truck & Trailer Body Co.
- Arbortech
- Baker Equipment
- MAT-3, Inc.
- MTI Insulated Products Inc.
- Polecat Industries, Inc.
- Terex Telelect, Inc.
- VERSALIFT, TIME Manufacturing Co

**Aerial Lifts - Parts & Equipment**
- Aerial Lift, Inc.
- Alliance Equipment Company, Inc.
- Altec Industries, Inc.
Manufacturers ...

Fertilization/Aeration Equipment
- Concept Engineering Group, Inc. (CEG)
- Doggett Corporation
- Grow Gun Corporation
- Minnesota Wanner Company
- Nu-Arbor Tree & Shrub Care Products
- Rear's Mfg. Co.

Fertilization Supplies
- Creative Sales, Inc.
- Doggett Corporation
- GreenPro Services
- Grow Gun Corporation
- Growth Products, Ltd.
- Horticultural Alliance, Inc.
- J. J. Mauget Company
- Monterey Lawn & Garden Products
- Nu-Arbor Tree & Shrub Care Products
- Plant Health Care, Inc.
- Remke Enterprises, Inc.
- ROOTS®
- Tree Tech Microinjection Systems

Footwear
- Karl Kuemmerling, Inc.
- West Coast Shoe Co.

Fungicides
- ArborSystems, LLC
- Bayer Corporation, Ag. Division
- Cleary Chemical Corp.
- Growth Products, Ltd.
- J. J. Mauget Company
- Monterey Lawn & Garden Products
- Tree Tech Microinjection Systems

General Arborist Supplies
- Arborwear, LLC
- Bahco Tools Inc.
- Bartlett Manufacturing Company
- Bashlin Industries, Inc.
- Buckingham Manufacturing Co., Inc.
- Corona Clipper
- Fano Saw Works
- Jameson
- Karl Kuemmerling, Inc.
- Oregon Cutting Systems
- Peavey Mfg. Co.
- Vermeer Manufacturing Company
- Village Blacksmith/Olympia Industrial
- Wall Industries
- Weaver Leather, Inc.
- Yale Cordage, Inc.

Grapples/Loaders
- Implemax Equipment Co., Inc.
- Vermeer Manufacturing Company

Grinders, Horizontal
- Bandit Industries, Inc.
- Fecon, Inc.
- Morbark, Inc.

Ground Cover Equip/mats
- Alturmamats, Inc.
- DICA Marketing Co.

Growth Retardants/Regulators
- Dow AgroSciences
- Monterey Lawn & Garden Products
- Tree Tech Microinjection Systems

Herbicides
- Bayer Corporation, Ag. Division
- BBA Nonwovens/Reemay Inc.
- Dow AgroSciences
- Monterey Lawn & Garden Products
- Tree Tech Microinjection Systems

Hydraulic Tools & Equipment
- ADI Pruning Tools
- FCI-Racine Hydraulic Tools
- Reliable Equipment & Service Co Inc.

Insecticides
- ArborSystems, LLC
- Aventis Environmental Science
- Cleary Chemical Corp.
- Creative Sales, Inc.
- Dow AgroSciences
- FMC Corporation-APG Specialty Prod.
- J. J. Mauget Company
- Monterey Lawn & Garden Products
- Tree Tech Microinjection Systems

Integrated Pest Management
- Plant Health Care, Inc.

Irrigation/Aeration Products
- Concept Engineering Group, Inc. (CEG)

Knives, Chipper
- International Knife & Saw, Inc.
- Karl Kuemmerling, Inc.
- The Knifesource, LLC
- Simonds Industries, Inc.
- Vermeer Manufacturing Company
- Wood/Chuck Chipper Corporation
- Woodsman Chippers
- Zenith Cutter Co.

Knives, Chipper Repair
- International Knife & Saw, Inc.
- The Knifesource, LLC
- Simonds Industries, Inc.
- Vermeer Manufacturing Company
- Woodsman Chippers

Lawn Maintenance Equipment
- Alturmamats, Inc.
- Concept Engineering Group, Inc. (CEG)
- Corona Clipper
- Dynamic Manufacturing Corp.
- Gravely Division of Ariens
- Minnesota Wanner Company
- Rear's Mfg. Co.
- Shindaiwa, Inc.

Lightning Protection Systems
- Independent Protection Company

Micro Injections
- J. J. Mauget Company
- Tree Tech Microinjection Systems

Miticides
- ArborSystems, LLC
- Tree Tech Microinjection Systems

Mulch Coloring Equipment
- Fecon, Inc.
- Morbark, Inc.

Natural Homeopathic Remedies
- Doggett Corporation

Organics
- Growth Products, Ltd.

Personal Protective Equipment
- Arborwear, LLC
- Bartlett Manufacturing Company
- Bashlin Industries, Inc.
- Buckingham Manufacturing Co., Inc.
- Excalibur DMM
- Stihl Incorporated
- Tilton Equipment Co c/o Jonsered/EFCO
- Vermeer Manufacturing Company
- Wall Industries

Pneumatic Tools
- Concept Engineering Group, Inc. (CEG)

Power Pruning Equipment
- Florian Ratchet-Cut
- Husqvarna
- Jameson
- Redmax-Komatsu Zenoah America Inc.
- Shindaiwa, Inc.
- Stihl Incorporated
- Tanaka Power Equipment
- Village Blacksmith/Olympia Industrial

Pruning Supplies
- Bahco Tools Inc.
Manufacturers ...

**Pruning Supplies (cont.)**
- Bartlett Manufacturing Company
- Bashlin Industries, Inc.
- Corona Clipper
- Fanno Saw Works
- Florian Ratchet-Cut
- Fred Marvin Associates
- Future Forestry Products Inc.
- Jameson
- Oregon Cutting Systems
- Peavey Mfg. Co.
- Village Blacksmith/Olympia Industrial

**Pumps**
- Minnesota Wanner Company
- Rear's Mfg. Co.
- Tanaka Power Equipment

**Recycling Equipment/ Wood Processors**
- Bandit Industries, Inc.
- Big Foot Industries Incorporated
- Dynamic Manufacturing Corp.
- Fecon, Inc.
- Morbark, Inc.
- Mountain Valley Mfg. Inc.
- Timberwolf Manufacturing Corporation
- Wood-Mizer Products, Inc.
- Woodsman Chippers

**Root Barriers**
- Deep Root Partners L.P.

**Root Cutters**
- Corona Clipper
- Vermeer Manufacturing Company

**Rope**
- Bartlett Manufacturing Company
- Bashlin Industries, Inc.
- Buccaneer Rope Co.
- Columbian Specialty Products
- Karl Kuemmerling, Inc.
- New England Ropes, Inc.
- Samson Rope Technologies
- Vermeer Manufacturing Company
- Wall Industries
- Yale Cordage, Inc.

**Right-of-Way/ Land Clearing Equipment**
- Bandit Industries, Inc.
- Brown Manufacturing Corp.
- Brush Technology
- FAE Grinding Equip., LLC
- Fecon, Inc.
- Franklin Equipment Company
- Gyro-Trac, Inc.
- Implemax Equipment Co., Inc.
- John Brown & Sons Inc.
- Rayco Manufacturing, Inc.
- Southern Farm Equipment Inc.
- Vermeer Manufacturing Company
- Wood/Chuck Chipper Corporation

**Skidsteer Loaders & Implements**
- Brush Technology
- Gyro-Trac, Inc.
- Implemax Equipment Co., Inc.
- Woodsman Chippers

**Snow Removal Equipment**
- Dynamic Manufacturing Corp.
- Gravelly Division of Ariens

**Soil Amendments**
- Doggett Corporation
- GreenPro Services
- Growth Products, Ltd.
- Plant Health Care, Inc.
- Remke Enterprises, Inc.

**Sprayers & Accessories**
- Bartlett Manufacturing Company
- ESSCO Distributors Inc.
- GreenPro Services
- Gyro-Trac, Inc.
- John Bean Sprayers
- Minnesota Wanner Company
- Northeastern Arborist Supply
- Rear's Mfg. Co.
- Shindaiwa, Inc.
- Southern Farm Equipment Inc.

**Stump Cutters**
- J. P. Carlton Company, Div. DAF Inc.
- Doskocil Industries, Inc.
- Dynamic Manufacturing Corp.
- Husqvarna
- Miller Machine Works
- Praxis Corp.
- Rayco Manufacturing, Inc.
- Stump Removal Inc./KAN-DU
- Sunrise Concepts Inc.
- Vermeer Manufacturing Company

**Stump Cutters PTO**
- Fecon, Inc.
- Miller Machine Works

**Stump Cutters – Teeth**
- Border City Tool & Manufacturing Co.
- J. P. Carlton Company, Div. DAF Inc.
- CEI
- Dynamic Manufacturing Corp.
- Fecon, Inc.
- Leonardi Teeth/Simonds Industries Inc.
- Rayco Manufacturing, Inc.
- Vermeer Manufacturing Company

**Sweepers**
- Redmax-Komatsu Zenoah America Inc.
- Shindaiwa, Inc.

**Traffic Safety**
- Bartlett Manufacturing Company
- Karl Kuemmerling, Inc.

**Tree Injection/Implants**
- ArborSystems, LLC
- Creative Sales, Inc.
- Doggett Corporation
- GreenPro Services
- Grow Gun Corporation
- J. A. Mauget Company
- Remke Enterprises, Inc.
- Tree Tech Microinjection Systems

**Tree Protectors**
- Deep Root Partners L.P.

**Tree Spades**
- Vermeer Manufacturing Company

**Tree Transplanting Equipment**
- Vermeer Manufacturing Company

**Trenchers**
- Concept Engineering Group, Inc.,(CEG)
- Doskocil Industries, Inc.
- Vermeer Manufacturing Company

**Trucks & Truck Accessories**
- Aerial Lift, Inc.
- American Truck & Trailer Body Co.
- DICA Marketing Co.
- Plastic Composites Corporation
- Royal Truck & Equipment, Inc.
- Schodorf Truck Body & Equipment Co.
- Southco Industries, Inc.
- Specialized Hydraulics, Inc.

**Tub Grinders**
- Fecon, Inc.
- Morbark, Inc.
- Vermeer Manufacturing Company

**Used Equipment**
- Karl Kuemmerling, Inc.
- Morbark, Inc.
- Rayco Manufacturing, Inc.
- Schodorf Truck Body & Equipment Co.
- Specialized Hydraulics, Inc.
- Vermeer Manufacturing Company
- Wood/Chuck Chipper Corporation

**Wood Furnaces, Outdoor**
- Central Boiler
Industry Support and Service Providers

Industry Support & Service Providers

Aerial Lifts Parts & Equipment
- Aerial Equipment, LLC
- Mickey's Truck & Equipment Sales Inc.

Aerial Lift Parts & Equipment - Repair
- Aerial Equipment, LLC
- Aerial Lift, Inc.
- Sunbelt Rentals

Business Opportunity
- Arbor Computer Systems
- Christmas Decor & Nite Time Decor
- DG Productions, Inc.

Computer Software/Hardware
- ACRT, Inc.
- Arbor Computer Systems
- Creative Automation Solutions/
Practical Solutions, Inc.
- Tree Management Systems, Inc.

Consulting - Business
- Arbor Computer Systems
- Arborist Skills, Inc.
- Creative Automation Solutions/
Environmental Consultants, Inc.
- Howard L. Eckel & Associates
- International Knife & Saw, Inc.
- OCA UK Limited
- Treevolution

Consulting - Urban Forestry
- ACRT, Inc.
- Safetrees

Diagnose Disease
- Concept Engineering Group, Inc.(CEG)

E-Commerce for Businesses
- Forestindustry.com
- Greenindustry, Inc.

Education/Workshops/Training/Recruitment
- ACRT, Inc.
- Arborist Skills, Inc.
- ArborMaster Training Canada, Inc.
- ArborMaster Training, Inc.
- Forest Applications Training, Inc.
- Integrity Tree Care/
Training with Integrity
- J. J. Mauget Company
- Niemeyer Corporation
- Safetrees
- Tree Climbers International
- Tree Safety International
- Tree Tools
- Treevolution

Fertilization Supplies Application
- ESSCO Distributors Inc.

Financing
- American Express Business Finance
- C. A. G. Corporation
- Greystone Financial Group, Inc.
- Liberty Financial Group, Inc.
- OBL Financial Services, Inc.
- Pete Mainka Enterprises, Inc.
- Progress Leasing Company
- Southeastern Equipment Company
- Tree Tools

GPS Mapping
- ACRT, Inc.
- Vermeer Manufacturing Company

Insurance
- Camberford Law PLC
- CNA Commercial Insurance
- Crichton, Perry, Brandon, Jackson, &
Hal Rose Agency Inc.
- The Hartford
- National Insurance Programs
- NRC Insurance Agency
- Ogilvy Hill Insurance
- Robert Squillare Insurance Agency
- Sol J. Oberman Insurance
- T. I. S. Insurance Services Inc.
- TreePro Direct™

Lease/Rental
- Aerial Equipment, LLC
- Baker Equipment
- Greystone Financial Group, Inc.
- Karl Kuemmerling, Inc.
- Liberty Financial Group, Inc.
- Lowe's Company, Inc.
- MAT-3, Inc.
- Progress Leasing Company
- Southeastern Equipment Company
- Vermeer Manufacturing Company
- WesSpur, LLC

Pneumatic Tools - Repair
- Aerial Lift, Inc.
- Reliable Equipment & Service Co Inc.

Recycled Wood Processors - Repair
- MAT-3, Inc.
- Southeastern Equipment Company

Regulatory Affairs
- ACRT, Inc.

Repair/Rebuilding
- Cleaves Company, Inc.
- MAT-3, Inc.
- Niemeyer Corporation
- Pacific Arborist Supplies, Ltd.
- Professional Tree & Turf Equipment
- Shelter Tree, Inc./Tree Care Products
- Southeastern Equipment Company
- Specialized Hydraulics, Inc.
- Tree Tools
- Vermeer Manufacturing Company
- WesSpur, LLC

Soil Amendment
- Concept Engineering Group, Inc.(CEG)

Staffing
- Complete Tree Care

Transportation Services
- Mayo Global Transportation Inc.
Alphabetical Listing

Associate Member of the National Arborist Association

(D) Distributor

(M) Manufacturer

(S) Industry Support and Services Provider

(S) ACRT, Inc.
PO Box 401
Cuyahoga Falls OH 44221-0401
Toll-free: 800-622-2562
Phone: 330-945-7500
Fax: 330-945-7200
E-mail: reabbott@acrtinc.com
Web: www.acrtinc.com
Contact: Mr. Richard E. Abbott

(M) ADI Pruning Tools
by TOL Incorporated
PO Box 1498
Tulare CA 93275
Toll-free: 800-732-2142
Phone: 559-686-2844
Fax: 559-685-1006
E-mail: scott@tol-inc.com
Web: www.tol-inc.com
Contact: Mr. Scott Hermann

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(M) Aerial Lift, Inc.
PO Box 66
Milford CT 06460
Toll-free: 800-446-5438
Phone: 203-878-0694
Fax: 203-878-2549
E-mail: rmatalr@aol.com
Web: www.aerialift.com
Contact: Mr. Rich Mitchell

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(M) Agape Designs
2047 West Elliot Road
Chandler AZ 85224
Toll-free: 800-990-TREE (8733)
Phone: 480-899-9831
E-mail: agapetree@msn.com
Web: www.agapetrees.com
Contact: Ms. Doreen Orist

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(D) Ahlborn Equipment, Inc.
PO Box 500
Sayner WI 54560-0500
Toll-free: 800-472-7600
Phone: 715-542-3271
Fax: 715-542-3267
E-mail: ahlborn@minex.net
Contact: Mr. Gene Ahlborn

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(D) Alatec Scientific Inc.
1508 Soutl St
Mandeville LA 70448
Phone: 504-482-3203
Fax: 504-727-4659
E-mail: Gerard021@cs.com
Contact: Mr. Gerard Rodrigues

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(D) Alexander Equipment Co., Inc.
4728 Vender Ave
Lisle IL 60532
Phone: 630-663-1400
Fax: 630-663-9754
E-mail: alexanderequip.com
Web: www.alexanderequip.com
Contact: Mr. Steve Johnston

(M) Alliance Equipment Company, Inc.
1000 North Union Ave
Alliance OH 44601
Toll-free: 800-383-2290
Phone: 800-383-2291
Fax: 330-821-8375
E-mail: smc@neo.rr.com
Web: www.alliance-equipment.com
Contact: Ms. Sharon McCarty

(M) Altec Industries, Inc.
31 Inverness Center Pkwy
Ste 130
Birmingham AL 35242
Toll-free: 800-958-2555
Phone: 205-991-7733
Fax: 205-981-2522
E-mail: headquarters@altec.com
Web: www.altec.com
Contact: Mr. David W. Hill

For over 70 years, Altec has provided equipment solutions, exceptional customer service, and the most advanced manufacturing and engineering techniques. We've made a business of understanding the unique requirements of every industry we serve and we remain committed to total customer satisfaction in everything we do. That's why we can stand behind our products with the most comprehensive warranty in the industry. Guaranteed, only from Altec.

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Available for immediate shipment is the latest in rigging equipment; a full line of safety gear; reference books and diagnostic supplies; professional quality saws and pruners; gear bags; gas- and air-powered pruners and saws. For your convenience, we now have 24-hour answering service and all orders received by 2 p.m. are shipped the same day! If you can't find it, CALL US - We locate that hard-to-find tool!
M) Becker-Underwood, Inc.
PO Box 667
Ames IA 50010
Toll-free: 800-232-5907
Phone: 515-232-5907
Fax: 515-232-5961
Web: www.bucolor.com

(D) Ben Meadows Company
401 S. Wright Rd
Janesville WI 53546
Toll-free: 800-241-6401
Phone: 800-241-6401
Fax: 800-628-2068
Web: www.benmeadows.com
Contact: Mr. Dan Deriscavage

(D) Blue Ridge Arborist Supply
17277 Poor Farm Rd
Culpeper VA 22701
Toll-free: 800-577-TREE (8733)
Phone: 540-829-6889
Fax: 540-829-6890
Web: www.blue ridgearborist supply.com
Contact: Ms. Stephanie Partlow
Blue Ridge Arborist Supply is committed to providing quality tree care equipment you know and trust. We are a family-owned and operated business with almost 20 years of experience in the tree service industry. Call for a catalog or stop by.

(D/M) Border City Tool & Manufacturing Co.
23325 Blackstone Ave
Warren MI 48089-2675
Toll-free: 800-421-5985
Phone: 586-758-5574
Fax: 586-758-7829
Contact: Mr. John R. Parenteau

(D/M) John Brown & Sons Inc.
14 B & B Lane,
Sawyer Industrial Park
Weare NH 03281
Toll-free: 888-B-BRonto
Phone: 603-529-7974
Fax: 603-529-7976
E-mail: bronto@gsinet.net
Web: www.brownbronto.com
Contact: Mr. Harvey Donaldson
Manufacturer of Brontosaurus mowing equipment, power line right-of-way maintenance and general land clearing.

M) Brown Manufacturing Corp
 Rt. 3 Box 339
 Ozark AL 36360-0339
 Toll-free: 800-633-8909
 Phone: 334-795-6603
 Fax: 334-795-3029
 Web: www.brownmfgcorp.com
 Contact: Mr. Jeff Thagard

(D) Brownwood Sales
1500 George Street
Sandusky OH 44870
Phone: 419-624-9832
Fax: 614-444-8744
Contact: Mr. Thomas L. Brown

(D) Brush Technology
6015 Pleasant Hill Rd
Hartford WI 53027
Phone: 262-670-6044
Fax: 262-670-0282
Contact: Mr. Gary Spencer
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(D) B-Trac Equipment Ltd.
45 - 1 Rixon Rd
Wellingborough, Northants NN8 4BA
United Kingdom
Phone: 01933 274400
Fax: 01933 274403
Web: www.b-trac.co.uk
Contact: Mr. M.J. Wright

(M) Buccaneer Rope Co.
22319 Alabama Hwy 79
Scottsboro AL 35768
Toll-free: 800-358-ROPE (7673)
Phone: 256-587-6232
Fax: 256-587-9223
E-mail: bucrope@Hiwaay.net
Contact: Mr. Dan Pockman

(D) Buckeye Power Sales
5000 Transamerica Dr
Columbus OH 43228-9335
Phone: 614-861-6000
Fax: 614-861-2291
Web: bpssuperstore.com
Contact: Mr. Donald E. Bohls
Buckingham Manufacturing Co., Inc.
PO Box 1690
Binghamton NY 13902
Toll-free: 800-937-2825
Phone: 607-773-2400
Fax: 607-773-2425
E-mail: jimp@buckinghammfg.com
Web: www.buckinghammfg.com
Contact: Mr. James Pennefeather

A leading manufacturer of climbing equipment since 1896. Specializing in saddles, climbers, lanyards, harnesses, shock absorbers and accessories for the bucket truck.

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C.A.G. Corporation
10 Hillman Drive - Suite 104,
Chadds Ford Professional Campus
Chadds Ford PA 19317
Toll-free: 800-932-2274
Phone: 610-558-3800
Fax: 610-558-1949
E-mail: cb@cagcorp.com
Web: www.cagcorp.com
Contact: Mr. Christopher Grivas

CEI
PO Box 406
Osseo MN 55369
Toll-free: 800-333-5234
Phone: 763-425-1167
Fax: 763-424-9528
Web: www.cei-clem.com
Contact: Mr. Ryan Murray

CNA Commercial Insurance
CNA Plaza 37 South
Chicago IL 60685
Toll-free: 800-CNA(262)-6241
Phone: 312-622-7429
Fax: 312-817-0775
E-mail: michael.prokop@cna.com
Web: www.cna.com/commercial
Contact: Mr. Mike Prokop

Camberford Law PLC
Lygon House, 50 London Road
Bromley, Kent BR1 3RA
United Kingdom
Phone: 02083155000
Fax: 02084602118
E-mail: dominiquek@camberford-law.co.uk
Contact: Miss Dominique Kelly

(C) Capital Engine Co.
97 Cypress St
Reynoldsburg OH 43068
Phone: 740-964-0089
Fax: 740-964-0186
Contact: Mr. Thomas Cowher

Cargotec Inc.
923 Hills Creek Dr
McKinney TX 75070
Phone: 972-529-1105
Fax: 972-529-1598
Contact: Mr. Tom Hirt

J. P. Carlton Company, Division DAF Inc.
121 John Dodd Rd
Spartanburg SC 29303
Toll-free: 800-243-9335
Phone: 864-578-9335
Fax: 864-578-0210
Web: www.stumpcutters.com
Contact: Mr. Daniel R. Falatok

The Cat Rental Store
24460 Novi Rd
Novi MI 48375
Toll-free: 888-642-4228
Phone: 248-349-4800
Fax: 248-380-5474
Contact: Mr. Steve Darmofal

Central Boiler
20502 160th St.
Greenbush MN 56726
Toll-free: 800-248-4681
Phone: 218-782-2575
Fax: 218-782-2580
Web: centralboiler.com
Contact: Mr. Steve Darmofal

Wood Heating - Outdoor wood furnaces from residential to commercial. Reduce dumping costs. Heat multiple buildings with unsplit wood up to 50" in diameter.

Christmas Decor & Nite Time Decor
PO Box 5946
Lubbock TX 79408
Toll-free: 800-687-9551
Phone: 806-722-1225
Fax: 806-722-9627
E-mail: Blake@ChristmasDecor.net
Web: www.ChristmasDecor.net/
www.NiteTimeDecor.com
Contact: Mr. Blake Smith

Commercial Cutters Direct
6450 Pottery Rd
Warners NY 13164
Toll-free: 800-611-8486
Phone: 315-468-4248
Fax: 315-468-4183
Web: www.commercialcutters.com
Contact: Mr. Michael Harris

Complete Tree Care
Rockhill Farm Clun
Craven Arms, Shropshire SY7 8LR
United Kingdom
Phone: 01588940457
Fax: 01588640179
E-mail: bruceblackman@completetreecare.co.uk
Contact: Mr. Bruce Blackman
Concept Engineering Group, Inc. (CEG) /AIR SPADE®

15 Plum St.
Verona PA 15147-2100
Toll-free: 888-557-2339
Phone: 412-826-8800
Fax: 412-826-8601
E-mail: andyjarabak@air.spade.com
Web: www.air-spade.com

Contact: Mr. Andy Jarabak
Manufacturer of the genuine AIR-SPADE product line, which can uncover roots without damaging valued trees, shrubs and plants. AIR-SPADE uses powerful supersonic air jets that excavate root area soils.

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Creative Sales, Inc.
PO Box 501
Fremont NE 68026-0501
Toll-free: 800-759-7739
Phone: 402-727-4800
Fax: 402-727-4841
E-mail: wdw@uswest.net
Web: www.acecap-medicap.com
Contact: Mr. Bryan Wolfe

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Corona Clipper
PO Box 1388
Corona CA 92879
Toll-free: 800-234-2547
Phone: 909-737-6515
Fax: 909-737-8657
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Web: www.coronaclipper.com
Contact: Mr. John Reisbeck

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E-mail: cleanair@enginaire.com
Web: www.enginaire.com
Contact: Mr. Bill Decker

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Indianapolis IN 46268-1054
Toll-free: 800-263-1196
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Contact: Mr. Kevin Tomka

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Web: www.dosko.com
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St. Louis MO 63130
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Web: droegequip.com
Contact: Mr. Kevin Tomka

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PO Box 545
Mount Pleasant MI 48858
Phone: 989-644-8109
Fax: 989-644-8109
Contact: Mr. Thomas R. Gross

Eckel & Associates
PO Box 225
St. Michaels MD 21663
Phone: 410-745-4141
E-mail: hleckel@expresshost.com
Contact: Mr. Howard Eckel

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Janesville WI 53547
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Fax: 865-986-0450
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Web: gandaequipment.com
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E-mail: Gstonefin@aol.com
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Fax: 219-479-5309
E-mail: Sales@mtiip.com
Web: www.mtiip.com
Contact: Mr. David C. Wick

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Pewaukee WI 53072-2542
Phone: 262-691-4306
Fax: 262-691-4644
Contact: Mr. Peter J. Mainka

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(M) Marshall Manufacturing
RR #2 Box 190B
Hastings NE 68901
Phone: 866-463-3661
Web: www.forestindustry.com/marshallmfg
Contact: Ms. Marlene Marshall

(M) Fred Marvin Associates
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Web: mcdonaldequipment.com
Contact: Mr. Scott McDonald

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Fax: 952-882-4786
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Web: www.mtnvalleymfg.com
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Portland OR 97269-2127
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Fax: 503-653-4201
E-mail: dave.dougherty@oregonchain.com
Web: www.oregonchain.com
Contact: Mr David Dougherty

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E-mail: peavey@mint.net
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Fax: 309-578-7329
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Web: www.perkins.com
Contact: Ms. Dawn Kershaw

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Fax: 904-278-0881
Web: www.perkinspower.com
Contact: Mr. Joe Campbell

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PO Box 160447
Clearfield UT 84016
Toll-free: 877-807-3805
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Fax: 801-327-3807
E-mail: info@petzl.com
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Phone: 412-826-5488
Fax: 412-826-5445
Web: www.planthealthcare.com
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Fax: 217-379-2614
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<td>614-436-9066</td>
<td>614-888-5315</td>
<td><a href="mailto:solns@netwalk.com">solns@netwalk.com</a></td>
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<td><a href="mailto:steve@praxisillinois.com">steve@praxisillinois.com</a></td>
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<td>Mr. Steve Hooser</td>
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<td><a href="mailto:inquiries@preformed.com">inquiries@preformed.com</a></td>
<td><a href="http://www.preformed.com">www.preformed.com</a></td>
<td>Mr. Terry Krafick</td>
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<td>Mike Davison</td>
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<td>770-381-5147</td>
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<td>215-357-9193</td>
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<td><a href="http://www.reliable-equip.com">www.reliable-equip.com</a></td>
<td>Mr. Norman Delan, Jr.</td>
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<td>630-810-1662</td>
<td>630-810-0947</td>
<td><a href="mailto:remkedg@aol.com">remkedg@aol.com</a></td>
<td><a href="http://www.reliable-equip.com">www.reliable-equip.com</a></td>
<td>Mr. Jim Lutz</td>
</tr>
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<td>Rental Service Corporation</td>
<td>16225 Park Ten Place, Houston TX 77084</td>
<td>281-647-5111</td>
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