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# Boning up on Bio-Resources

By Felicia Gillham, Managing Editor

Finding good information about biological approaches to plant health can be difficult. Over the last 12 months, I've searched the Internet and bookstores for insightful resources. Although I know that I have personally just scratched the web surface, I thought I would share some of the sites, documents and books that I have found. Beware, because I cannot vouch for the scientific validity of the information these sources provide.

If you, too, enjoy the search for quality resources, please share them with us all in the PHC-TALK Discussion Forum. Periodically, we will combine the sources into a database for easy access here in the PlantHealthCare.com Online Magazine.

## *ACRES U.S.A.*

This monthly publication is described by its publishers as "A Voice for Eco-Agriculture." Available on a subscription basis for \$24 per year (12 issues), the magazine's theme is "To be economical, agriculture must be ecological." The publishers also have an extensive list of books available for purchase. Acres U.S.A., Inc., P.O. Box 91299, Austin, TX 78709. Phone: 512-892-4400.

Fax: 512-892-4448.

E-mail: [info@acresusa.com](mailto:info@acresusa.com)

## *The IPM Practitioner*

An excellent periodical published 10 times a year, the Practitioner is edited by William Quarles who writes some of the most extensively researched articles about non-pesticidal approaches in the industry. A subscription to Practitioner is a benefit of membership in the Bio-Integral Resource Center (BIRC), a non-profit corporation that undertakes research and education in integrated pest management. BIRC, P.O. Box 7414, Berkeley, CA 94707.

Phone: 510-524-2567.

Fax: 510-524-1758.

## *Tree Physiology*

This "international botanical journal" makes more than 700 *Tree Physiology* articles available online as PDF (Portable Document Format) files (which can be viewed with free Acrobat Reader software). Access to articles published before 1998 is unrestricted. For subscription charges, visit the web site. Heron Publishing, 202-3994 Shelbourne St, Victoria, BC V8N 3E2, Canada.

Web Site:

<http://www.heronpublishing.com/tphome.html#Online>

## *Plant Biology*

The Thieme-connect.com web site contains the online articles from journals published by the Thieme Publishing Group, including its journal *Plant Biology*. When you go to the site, be sure to click on "English Version" link on the left side of the web page unless you speak German. Georg Thieme Verlag, Stuttgart, New York. Web Site:

<http://www.thieme-connect.com/>

## Bio-Oriented Resources CONTINUED

### PANUPS

PANUPS is a weekly email news service produced by Pesticide Action Network North America (PANNA), a non-profit and non-governmental organization working to advance sustainable alternatives to pesticides worldwide. PANNA, 49 Powell St., Suite 500, San Francisco, CA 94102.

Phone: 415-981-1771.

Fax: 415-981-1991.

E-mail: [panna@panna.org](mailto:panna@panna.org)

Web Site: <http://www.panna.org>

### Beneficial Organisms

“Suppliers of Beneficial Organisms in North America, 1997”

Charles D. Hunter.

Provides general information on beneficial organisms and their use against pests. Lists 142 suppliers of over 130 different species of beneficial organisms sold for use as biological pest control in Canada, the United States and Mexico. Includes scientific name index and list of references, plus a web site on biological control and Integrated Pest Management (IPM). It's free. 32 pages.

State of California Department of Pesticide Regulation, Environmental Monitoring & Pest Management, 830 K St., Sacramento, CA 95814-3510.

Phone: 916-324-4100.

Web Site: <http://www.cdpr.ca.gov>

### Journals of Sustainable Agriculture, Forestry

If abstracts are helpful to you, these publications provide them for each of the articles published since 1995. BUBL Information Service, Andersonian Library, Strathclyde University, 101 St James Road, Glasgow G4 0NS, Scotland  
E-mail: [bubl@bubl.ac.uk](mailto:bubl@bubl.ac.uk)

Web Site: <http://bubl.ac.uk/journals/agr/>

### Clean Water Action Guide

“Protecting Groundwater from Pesticides: A Clean Water Action Guide, 2000,” by Velma M. Smith, of Friends of the Earth, covers pesticide basics, fundamentals of groundwater, health effects, pesticides and groundwater, government response and how to ensure that your protection plan is effective.

Includes list of state and federal regulators in the U.S. responsible for developing pesticide management plans. 67 pages. \$10. Available at

<http://www.foe.org/safefood/groundwater>  
Friends of the Earth, 1025 Vermont Ave., NW, Suite 300, Washington, DC 20005-6303. Phone: 202-783-7400.

Fax: 202-783-0444. E-mail: [foe@foe.org](mailto:foe@foe.org)

Web Site: <http://www.foe.org>

### Edaphos

“Edaphos: Dynamics of a Natural Soil System,” Second Edition, 1999, by Paul D. Sachs. Explains detailed relationships between soil and the environment. Examines soil systems and their interaction with climate, plants, air, microbes, minerals, animals and water. Features chapters on soil evolution, water, pests, composting and more. 201 pages. \$14.95. Edaphic Press, P.O. Box 107, Newbury, VT 05051.  
Phone: 802-222-4277.

Fax: 802-222-9661.

E-mail: [ep@connriver.net](mailto:ep@connriver.net)

### Environment Australia

This government web site, Environment Australia Online, has loads of databases and articles available. Keep in mind that some of the information is specifically applicable to this land “down under.”

Department of Environment and Heritage, GPO Box 787, Canberra ACT 2601 Australia

Web Site: <http://www.erin.gov.au/>

### Sustainable Agriculture Network

This educational web site has information online, as well as listings of free bulletins and books for purchase.

University of Florida, Institute of Food and Agricultural Sciences, Gainesville, FL 32611 Web Site: <http://www.sare.org/>

## Bio-Oriented Resources CONTINUED

### Soil Foodweb

Dr. Elaine Ingham's Soil Foodweb Incorporated web site offers a wide variety of information about the microorganisms that live in soil and around the roots of plants. Educational materials and services available for purchase. Soil Foodweb Inc., 1128 NE 2nd St., Suite 120, Corvallis, OR 97330. Phone: 541-752-5066. Fax: 541-752-5142. E-mail: [info@soilfoodweb.com](mailto:info@soilfoodweb.com) Web Site: <http://www.soilfoodweb.com>

### Weed Science

"Fundamentals of Weed Science," Second Edition, 1999, by Robert L. Zimdahl. Introductory text presenting explanation of weed classification, weed ecology, methods of weed management and control. Includes chapters on biological weed control and mechanical, non-mechanical and cultural weed control. Features discussion of herbicide use, including properties, formulation, application and impact on environment. 556 pages. \$59.95. Academic Press Inc., 525 B Street, Suite 1900, San Diego, CA 92101-4495. Phone: 800-321-5068. E-mail: [name@acad.com](mailto:name@acad.com) Web Site: <http://www.apnet.com>

### Botanica: The Illustrated A-Z of Over 10,000 Garden Plants

by Graham Ross (July 1999)

An encyclopedia covering garden plants from coniferous trees to epiphytic orchids, with attention paid both to species and selections, the unusual and the commonplace. Illustrated throughout with abundant color photographs. The volume employs a hardiness zone system, adapted from the USDA system and extended to the rest of the world. North American readers may find discrepancies with the original USDA zone system. \$59.95 at [www.amazon.com](http://www.amazon.com)

### Allergy-Free Gardening

by Thomas Leo Ogren (June 2000)

This book is described as helpful to anyone who wants to create their own allergy-free zone in their own yards. \$15.96 at [www.amazon.com](http://www.amazon.com)

### A Handful of Dirt

by Raymond Bial (Illustrator) May 2000

Soil may not be alive, but a multitude of microscopic creatures live there, battling it out in an eat-or-be-eaten world. These tiny creatures, invisible to our eyes, provide food for the insects that in turn feed the reptiles and mammals that live in and above the soil. Raymond Bial, an award-winning photo essayist, provides an eye-opening, down-and-dirty tour of one of the earth's most precious resources. For younger readers, but of interest to all ages. 32 pages. \$13.56 at [www.amazon.com](http://www.amazon.com)

### Endangered Plants Newsgroup

Listname: [Endangered\\_Plants](mailto:Endangered_Plants)  
This list covers seed and plant exchanges and cultivation methods of endangered plant species worldwide. Hosted at: [onelist.com](http://onelist.com) Contact Person: [america\\_del\\_sur@gmx.de](mailto:america_del_sur@gmx.de) Web Site: [http://www.onelist.com/subscribe.cgi/Endangered\\_Plants](http://www.onelist.com/subscribe.cgi/Endangered_Plants)

### State Soils

This USDA-NRCS National Soil Survey Center web site contains a "Soils Photo Gallery" and descriptions of soils per state. Web Site: [http://www.statlab.iastate.edu/soils/photo\\_gal/statesoils/list1.htm](http://www.statlab.iastate.edu/soils/photo_gal/statesoils/list1.htm)

# Got Green?

Guest Commentary by Sue Gibson, Associate Publisher/Executive Editor for the Landscape Group of Advanstar Communications Inc.

I'm not one to copy but I think the milk lobby has a great thing going—something by which the “Green Industry” can benefit.

The milk folks have a clear identity and a strong public relations program encouraging all of us to drink hearty and capture the calcium, vitamins and other benefits found in milk.

Why wouldn't this work for the Green Industry? It worked for pork (“the other white meat”) and cotton (“the fabric of our lives”) and would do wonderful things to promote the business and reputation of a group sorely needing a professional image: those who design, install and maintain landscapes across America.

Imagine a campaign extolling the virtues of professional landscape management services, documenting how these services enhance property values, and showing that this work is done by true professionals in a real profession. Wow! I like that.

This program could do a number of things for even the most minor segments of the industry, with hardly any negatives:

- Establish landscape management services as work that enhances our surroundings, serves a serious environmental purpose and beautifies our world.
- Shows trained, professional people working in a field that offers tremendous career opportunities, rewards and challenges.
- Gives students and prospective employees a positive image of our industry as a place offering a good future for them.
- Encourages homeowners and commercial clients to invest in more landscape development or renovation work.
- Gives value to regular landscape maintenance services.
- Explains specialty work like growing/nursery operations, irrigation, arbor care, hardscape, etc.
- Portrays landscape professionals as knowledgeable stewards of the land who handle materials and equipment wisely while improving our environment.

You get the picture. The image of professional training and service that so many landscape managers hunger for is exactly what this type of program could provide. But how could we get started with it?

## Who Are We?

I know the idea of a national PR campaign was kicked around a few years ago but those circumstances were different. At the time, the growers of America considered opting into a federal funding program that encouraged segments of the agricultural community to promote their goods. In the mid-1990s, the grower debate raged around the fact that industry members would have to pony up for a fee spread across the industry (those great advertising campaigns don't come cheap). For better or worse, the idea was voted down.

But could it work for our industry? I wish it would. But first, we have to define our industry. Even among ourselves—professional landscape managers, industry suppliers and the media—we have a hard time defining exactly who is part of the “Green Industry” and who is not.

I think the first way to start is to realize how fragmented and diverse this industry is. In fact, the fragmentation and diversity has worked against the industry by encouraging many special interest

## Think PR for the Green Industry CONTINUED

groups, rather than one large group representing many. But to start, let's look at the services that might be covered in a "Green Industry" definition:

- lawn maintenance (mow and blow)
- landscape and turf renovation
- chemical lawn care
- landscape installation
- landscape design/build
- irrigation maintenance and/or installation
- arbor care
- hardscape (lighting, cement, decks, driveways, pools, water features, etc.)
- in-house grounds/campus management
- athletic field maintenance
- golf course or playing area maintenance
- right of way maintenance
- erosion control
- interiorscaping
- growers
- nurseries
- garden centers
- pest control and perimeter treatments
- others?

### The Association Quandary

I think the next step is to get these segments of the industry discussing the option of a single, unified public relations program. One good place to start is through professional organizations; another is in the industry media.

There are several very good industry associations on a national and regional basis; each having different priorities, membership structures, and leadership. Some are vitally interested in regulation while others just care about business. That's fine since they respond to members' needs, but someone in each organization must "champion" this program and bring this topic up for discussion and action.

Assuming we could get one person in each group to take this project and run with it, what would then happen? I'd like to see a summit meeting at a big industry event like the Green Industry Expo or similar meeting. Leaders from the organizations could start talking about common goals for a PR program, financial goals, methods of funding, etc.

I know this can be done—it's been done before on a much smaller scale with the annual Gallup poll of homeowners using professional landscape services.

### Media: All Talk or Action?

Many of us in the "Green Industry" media know each other very well and actually belong to several organizations, such as TOCA (Turf and Ornamental Communicators Association). We also know that a widespread public relations program is something right up our alley and also something that would be useful and beneficial to our readers, advertisers and the general public.

I'd love to see a project like this become a priority at TOCA and with many of the industry's supplier companies as sponsors. It's an easy thing to promote in our editorial pages, seminars and web sites. The media also play a major role in educating our readers to the potential of such a program and how they can actively become involved.

### Involving Landscape Managers

Personally, I think our readers should support this because they're the ones to benefit, and they should provide financial support and active work through their own associations (at whatever level). It might cost them a good bit and certainly with the industry being so fragmented, some will carry the burden for others. But that's the price to pay for the benefits. I would love to see all of the industry's leading chemical lawn care and landscape companies and franchises make a serious financial commitment to getting this program going.

## Think PR for the Green Industry CONTINUED

Individual companies also need to step up to the bat and provide ongoing annual support for this program.

Industry suppliers and educational institutions also need to provide financial and other resources to make this program come together. Eventually, they'll all benefit as the landscape industry grows and prospers from these efforts.

### What Can We Do?

This program does not need to start out with millions of dollars of funding but it should start out with a solid plan. A well orchestrated identity program can include many events and inexpensive mailers on a local basis, special seminars or events on a statewide or regional basis, and limited advertising and public education efforts on a national basis—all having a high level of payoff for the efforts.

What would it be like? I'd love to see movie stars, governors, sports heroes, college presidents and others in television or print ads. I'd have them enjoying their own landscapes and telling others how great their outdoor spaces are.

I'd use real corporate leaders, grandmas at nursing homes, children with disabilities or homeowners in condo associations telling how much they have benefitted from their landscapes or special plantings.

It would be terrific to see landscape professionals working together at

Evergreen Foundation events building new "greenways" in communities and getting tons of great PR. Imagine how much goodwill the industry as a whole would get (even on a local basis) if landscape professionals banded together in many programs to volunteer, renovate or maintain public properties, such as national or regional veterans cemeteries, parks or school fields, even abandoned properties. What if the landscape industry became allied with Habitat for Humanity?

The possibilities are endless and my very modest ideas haven't even covered ways to show the wonderful training and experience professional landscape managers have. We need to get some real creative people into a room to devise the best ways to show how landscape work is a wonderful, creative career for those students in their elementary, secondary and college years.

And don't forget how perfect a national PR program is for comparing true professionals to those part-time wonders offering cheap prices, shoddy service and a very poor image of landscape work. The possibilities to show hard-working Hispanic employees, uniformed and polite managers on-site, or even design professionals creating new ideas goes so far in promoting professionalism and building goodwill.

### Second-class Respect

I can't resist—I love this idea because there are just too many innovative and professional landscape people providing

a first-class service and getting second-class respect and rewards for their efforts. The many "stakeholder" groups that will make or break this industry in the future (customers, suppliers, R&D, investors, regulators, media, general public, students) need to understand the real value these professionals bring to a property.

One sure way to do this is through a unified program. Call me crazy but I think this could actually be done, but not without a lot of effort getting individual segments of this industry to talk and listen to each other, focus on the benefits they'll all receive, and realize that further fragmentation and division only hurt the group.

I'm challenging them all to take a long-term view on this and be responsive to any overtures to work together on a program to promote professional landscape work throughout the U.S. And I'm challenging association members to start working in their groups to encourage their leadership to consider this program.

I thank Plant Health Care for the opportunity to give my opinion, and I'm happy to discuss any of these points with anyone interested in working with me to get this movement started. I'm easy to reach. Just call me at 440/891-2729 or fax me at 440/891-2675.

# At the Root of Disease

By Felicia Gillham, Managing Editor

## Soil-borne diseases occur in the pursuit of food, sex and a great apartment.

More correctly, soil microorganisms—bacteria and fungi—fight, pass on diseases, poison their foes, and kill when necessary to get the nutrients they need to reproduce and live in a choice sector of the soil. The most desirable real estate in the below-ground environment is called the “rhizosphere,” the area immediately surrounding the roots of plants.

Definitely a high-rent district, where rents may require the forfeiture of life, the rhizosphere is a battlefield of intense microbial activity. Here microorganisms compete with one another for the community’s most desirable feature: Root exudate. Exudates are organic substances that are sloughed, oozed or rubbed off plant roots as they grow and move through soil. These exudates support microbes whose activities in the rhizosphere benefit the plant. For example, certain phosphorus-solubilizing *Bacillus* bacteria thrive on root exudate.

With a steady diet of exudate, these bacteria will solubilize phosphorus into a form that the plant can use (something a plant cannot do on its own). Beneficial microorganisms supping on root exudates is “good” from a plant point of view. That some of the root exudate goes to feed pathogenic (disease-causing) microorganisms is “not good,” although it is a fact of nature.

Most pathogenic soil bacteria and fungi induce disease in plants not for the purpose of killing, but rather to ensure their access to root exudate. If they were to kill the plant outright, the oozing of exudate would stop. Therefore many plant diseases occur chronically. Chronic disease may make plants struggle, reduce yields or decrease their cosmetic appearance, but the plants remain alive.

The rhizospheric neighborhood would tip dangerously in favor of pathogens if infection by disease ensured that naughty microbes would win the war. Fortunately nature is complex. Over the millennia, microorganisms and plants evolved together. During those thousands of centuries, some microorganisms emerged as antagonistic or suppressive to certain pathogenic microbes. Even if the pathogen gains living space within or

on a plant, it may have to battle to remain there. Scores, if not thousands of strategies are used by microorganisms to thrive and out-compete others in their search for nutrients and space.

A common pathogenic bacterium, *Agrobacterium tumefaciens*, causes galls on woody and herbaceous plants by entering wounds it finds on the plant’s roots. Once inside, the bacterium stimulates the growth of undifferentiated (jobless) cells that mass together, create the galls, and ultimately interfere with the movement of water and nutrients within the infected plant. Nature, however, has a response to *A. tumefaciens* in the form of another *Agrobacterium* named *A. radiobacter* (in this case, specifically, *A. radiobacter strain K84*). When root-pruned seedlings are dipped into a suspension of strain K84 before planting, *A. radiobacter K84* produces a “bacteriocin,” a type of antibiotic that is antagonistic to *A. tumefaciens*.

## In Pursuit of Root Exudate CONTINUED

Another interesting case is one that actually yielded one of our first biocontrols for plant disease. Take-all, a disease of wheat, is caused by *Gaeumannomyces graminis*, a bacterium. Common sense tells us that repeated plantings of wheat would entice larger and larger populations of *G. graminis* within the soil thereby increasing the potential for take-all disease. In fact, multiple plantings of wheat appear to favor microbes that are antagonistic to *G. graminis* and create soil conditions that further prevents the plant pathogen from attacking the wheat. If you take soil from an area that is suppressive for take-all patch, and you put that soil into a field where take-all is present, disease suppression results. This is exactly what was done to control take-all disease through biocontrol or organic methods. Although scientists cannot explain if the mechanism behind this suppression is caused by one microorganism or is caused by the interaction of many microbes, the relocation of suppressive soils is a demonstrated biocontrol.

*Sclerotinia minor* is a fungus that invades and rots plants, such as lettuce, when conditions are moist. Its nemesis is *Sporidesmium sclerotivorum*, a fungus and a fungal parasite in one single package. An obligate parasite of fungal sclerotia, *S. sclerotivorum* parasitizes *S. minor* and kills it by digesting it.

Microorganisms compete by eating each other out of house and home.

*Phytophthora* root rot is sometimes held at bay when populations of soil bacteria are high. To infect a susceptible plant root, *Phytophthora cinnamomi* (the pathogenic agent) extends mycelia through the soil and into a root. But in soils where microbial growth is balanced, the mycelial strands are colonized by the higher numbers of soil bacteria thereby thwarting the ability of *P. cinnamomi* to cause overwhelming infection.

Survival in the soil is serious business and takes many different forms. Researchers have just knocked on the door of what these various battling microbes can offer us and how they interact with one another in that bustling microbial megalopolis of the rhizosphere.

## About Planthealthcare.com Online Magazine

PlantHealthCare.com Online Magazine is posted at [www.planthealthcare.com](http://www.planthealthcare.com) for professionals who produce, design and maintain plant material in the arbor, landscape architecture/design, landscape maintenance, nursery/greenhouse, and parks and recreation industries.

Published as an educational service by Plant Health Care, Inc., the PlantHealthCare.com Online Magazine is designed to engage, educate and inform professionals about new technologies that promote the health of plants, specifically those that create

“sustainable” landscapes that cost less, provide more value and last longer. The magazine also seeks to open discussion about issues that impact the many businesses that serve the plant health industry.

## Meet Your Editors

### Bruce F. Shank Editor

Bruce Shank is owner of BioCOM, a horticultural communications company based in Palmdale, CA. He is the editor of *Irrigation Business & Technology*, managing editor of *TurfGrass Trends*, and former editor of *Landscape & Irrigation*, *Landscape Management* and *sportsTURF* magazines. He was graduated by the University of Missouri—Columbia with a degree in agricultural journalism in 1973. He is a past president of the American Society of Business Press Editors and a member of the Turf & Ornamental Communicators Association.

### Felicia L. Gillham Managing Editor

Felicia Gillham is owner of Gillham & Associates Marketing Communications, a San Diego, CA firm she established in 1989 to service the needs of turf and ornamental, agricultural and biotechnology companies. Articles written by Gillham on behalf of her clients have appeared in more than 100 Green Industry and farm trade publications. She is a 1980 graduate of the University of Missouri—Columbia with a degree in agricultural journalism. Gillham is a member of the Turf & Ornamental Communicators Association, American Agricultural Editor's Association and the National Association of Farm Broadcasters.

### Sue Gibson Guest Commentator

Sue Gibson has been involved in business-to-business communications for several years. She has written for a number of business, manufacturing, medical and “green industry” magazines as an editor and also as a free-lance writer. Gibson co-owned a profitable advertising and public relations agency for 11 years, serving clients in manufacturing and service industries, as well as the arts. Gibson has an undergraduate degree from Miami University of Ohio and an MBA from Cleveland State University in Cleveland. Currently, she is associate publisher/executive editor for the Landscape Group of Advanstar Communications Inc. in Cleveland. The group produces four publications and web sites serving the “green industry:” *Landscape Management* (reaching professional landscape managers); *Golfdom* (reaching golf course superintendents and owners); *Athletic Turf* (reaching sports field managers); and *TurfGrass Trends* (a research digest for turfgrass managers).

## Calendar of Industry Events

### February

4-7

Ohio Turfgrass Foundation Conference and Trade Show, Columbus, OH.  
888-683-3445.

8-10

South Carolina Nursery and Landscape Association Trade Show, Myrtle Beach.  
864-592-3868.

12-14

Illinois Landscape Contractors Association Winter Seminar, Lisle.  
630-472-2851.

16-17

Florida Nurserymen and Growers Association Horticultural Trade Show, Jacksonville. 904-356-5577.

19

Plant Health Care Sustainable Urban Landscape Workshop, Oklahoma City, OK. 940-483-1766.

19-23

Cornell Turf Management Short Course, Yorktown Heights. 607-255-1792.

20

Plant Health Care Sustainable Urban Landscape Workshop, Dallas, TX.  
940-483-1766.

21

Plant Health Care Sustainable Urban Landscape Workshop, Austin, TX.  
940-483-1766.

21-22

Landscape Industry Show, Long Beach, CA. 916-448-2522.

22

Plant Health Care Sustainable Urban Landscape Workshop, Houston, TX.  
940-483-1766.

23

Plant Health Care Sustainable Urban Landscape Workshop, Lafayette, LA.  
940-483-1766.

28

New Jersey Landscape 2001 Trade Show, Secaucus. 201-664-6310.

Connecticut Groundskeepers Association Turf and Landscape Conference, Hartford  
203-699-9912.

### March

7-9

Associated Landscape Contractors of America Student Career Days, Fort Collins, CO. 800-395-2522.

New England Regional Turf Conference and Show, Providence, RI.  
401-848-0004.

23-24

Plant Health Care Plant Biology Workshop, Frogmore, SC. 888-290-2640.

### April

8-10

Southern Chapter International Society of Arboriculture, Birmingham, AL.